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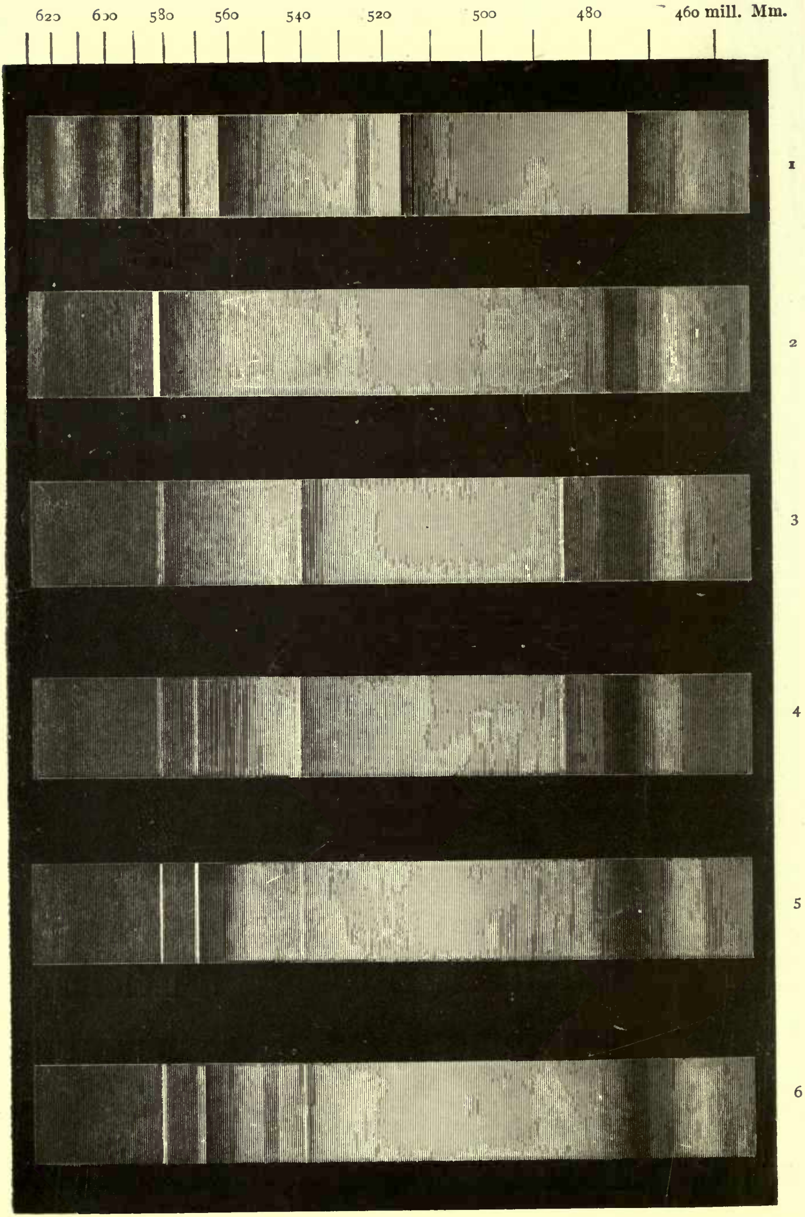
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VISUAL SPECTRA TYPE V COMPARED WITH TYPE IV (VOGEL).

1. Y Can. Ven.; 2. XVIII^h 3^m, S. 21° 16′; 3. VI^h 51^m, S. 23° 49′; 4, 5, 6. Wolf-Rayet, Nos. 1, 2, 3, Cygnus.

CELESTIAL OBJECTS

FOR COMMON TELESCOPES

BY

THE REV. T. W. WEBB, M.A., F.R.A.S.
LATE VICAR OF HARDWICK, HEREFORDSHIRE

SIXTH EDITION, THOROUGHLY REVISED

BY REV. T. E. ESPIN, M.A., F.R.A.S.

IN TWO VOLUMES
VOL. II.

WITH ILLUSTRATIONS

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Many things, deemed invisible to secondary instruments, are plain enough to one who 'knows how to see them' SMYTH.

When an object is once discovered by a superior power, an inferior one will suffice to see it afterwards SIR W. HERSCHEL.

Inertia mors est philosophiæ—vivamus nos et exerceamur
KEPLER.

Pulchra sunt omnia faciente Te, et ecce Tu inenarrabiliter pulchrior, qui fecisti omnia S. AUGUSTINE.

Sic enim magnalia sapientiæ suæ decoravit Is, qui est ante sæculum et usque in sæculum; nihil redundat, nihil deficit, nec locus est censuræ cujusquam. Quam desiderabilia opera ejus! * * * * * et quis saturabitur videns gloriam eorum? KEPLER

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PREFACE TO SIXTH EDITION.

In this sixth edition the general plan remains the same as in the previous edition. Additional notes have been added in Vol. I. where necessary, and Mr. W. F. Denning and the Rev. Theodore E. R. Phillips have kindly looked through the pages, and have mainly drawn these notes up. Such notes are indicated where necessary by the letters D and P at the end. It has been found quite impracticable to give the many observations of minute details of the Sun and Planets, nor indeed is it now necessary as these are published as 'Memoirs of the British Astronomical Association' from the work of the observing sections. Where, therefore, further information is required by the amateur, these should be consulted, since the work is done most thoroughly, and the memoirs are inexpensive. As the map of Mars was quite out of date, with the kind permission of the Council of the B. A. A., a chart by Antoniadi has been reproduced. Mr. Walter Goodacre has kindly revised the chapter devoted to the Moon, and has added a series of valuable notes which are published as an appendix. The map of the Moon in the previous edition was also quite out of date, and the new one is by Mr. Goodacre, who has so thoroughly made himself the authority on this subject. Mr. Franks has kindly written a note on the micrometer, since much valuable work may be done by the amateur, even with a moderate aperture, in the measurement of double stars. The note on photography confines itself to bare details of method, and the note on the spectroscope remains the same, since the visual method has been entirely superseded by the photographic. The

513

blocks used in illustration of Vol. I. have been kindly lent by the Council of the R. A. S. In Vol. II. the illustrations of Nebulæ and Clusters are from plates kindly supplied by the Director of the Lick Observatory. The Editor of the *English Mechanic* has kindly lent the blocks for the test fields ϵ Lyræ and Σ 2773.

Vol. II. has been rewritten, and every effort has been made to bring it up to date. Publications on double stars are now numerous, but not easy of access to the amateur, and it was thought well to complete the list as far as Mag. 6·5, and to give as far as possible later measures where there is motion. In the case of some of the rapid Binaries nothing could be done beyond giving a general idea of direction and distance. For some later unpublished measures I am indebted to the kindness of the Astronomer Royal, also to Mr. Franks and Rev. Th. E. R. Phillips. Mr. Innes, at my request, undertook to bring the list of Double Stars in the Southern Hemisphere up to date, the boundary being fixed beyond S. Decl. 31°. Mr. T. Lewis, who is so eminently the authority in England on double stars, has kindly furnished me with many valuable hints. As the previous index omitting the star places was found inconvenient, a new index giving the places as well as the page is now given, on the lines kindly suggested to me by Dr. W. H. Maw, for the double stars. This has been extended to the Nebulæ, red stars, and spectroscopic objects, and it is hoped that it will meet the requirements of those who work with Equatorials. The star places are for 1920, and have been simply corrected for precession, and no greater accuracy has been aimed at than in the previous editions. Mr. W. Milburn has rendered valuable aid in arranging the stars for the new index, and in reading through the proof sheets of each volume.

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PART III.

THE STARRY HEAVENS.

> Lift up your eyes on high, and behold Who hath created these things that bringeth out their host by number: He calleth them all by names by the greatness of His might, for that He is strong in power; not one faileth.—ISA. xl. 26.

DOUBLE STARS, CLUSTERS, AND NEBULÆ.

IF the Solar System had comprised in itself the whole material creation, it would alone have abundantly sufficed to declare the glory of GOD, and in our brief review of its greatness and its wonder we have seen enough to awaken the most impressive thoughts of His power and wisdom. But that system is but as a single drop in the ocean. What boundary may be set to creation we know not, but we can trace it sufficiently to perceive that, as far as our senses are concerned, it cannot be distinguished from absolute infinity: and in leaving our Sun and his attendants in the background, we are only approaching more amazing regions, and fresh scenes will open upon us of inexpressible and awful grandeur. We are now to contemplate not one Sun, but thousands and myriads: not a planetary system of subordinate globes, but aggregations of Suns; pairs, groups, galaxies of Suns—'the host of heaven'—all independent in unborrowed splendour, yet many evidently, and all by clear implication, bound together by the same universal law which keeps the pebble in its place upon the surface of the earth, and guides the falling drop of the shower, or the mist of the cataract. Many of these Suns may probably be smaller or dimmer than our own, yet others unquestionably far surpass his splendour; while as to distance, their remoteness is so inconceivable that light itself, flying with a speed which would encircle the Earth nearly 8 times in one second, only shows them to us as they formerly were, some years, others centuries, others perhaps whole ages back, even in the first dawn of creation. Here is indeed a field where enterprise cannot be thrown away, nor perseverance fail of its reward.

We must, however, remember that, though they are Suns which we are contemplating, and though the mere aspect of some of them in a large telescope well bears out the assertion,[1] yet a great proportion are diminished by distance to the minutest points of light, and can only be distinctly seen under favourable circumstances. We cannot therefore expect uniform success; in fact, the more delicate objects of stellar astronomy are not only among the severest tests of the telescope and the eye, but are peculiarly liable to be affected by atmospheric indistinctness, and require the most propitious skies. The cautions suggested in Part I. will be especially applicable here.

An original investigation of all the objects worthy of notice, even in a popular sense, in the starry heavens, would have been the attempt of a lifetime, rather than of such occasional hours of leisure as I could command: an unverified selection, on paper, from a standard list formed with a very different design, would have been an easy, but not a satisfactory task: a middle course has therefore been preferred. All such of the 850 Double Stars and Nebulæ of Vice-Admiral Smyth's Bedford Catalogue as my $3\frac{7}{10}$-in. of aperture could be expected to reach, were examined in succession,[1] and those only retained which seemed to possess sufficient general as well as scientific interest, and might serve as specimens of the universal profusion: but as in such a review a number of other objects, beautiful to the popular eye, though unimportant perhaps to the professed astronomer, presented themselves unsought, many of these have been added to the list, as well as many from Struve's 'Mensuræ Micrometricæ,' and other quarters. Such was the plan of the first edition. But the years that have since elapsed have brought such an unprecedented increase of observers and instruments competent to deal with a more difficult class of objects, that it has been thought desirable, without abandoning the original design or title of the work, to enlarge it in the hope of greater usefulness. An addition has accordingly been made of about 1080 pairs from Lord Lindsay's very valuable Summary of the Dorpat Catalogue, together with 70 from that of Poulkova, and many from the lists of Burnham.[2]

---

[1] The approach of Sirius to the field of H.'s 40-ft. reflector is said to have been ushered in by a dawning light, and its actual entrance to have been almost intolerable to the eye: yet the 4-ft. mirror was far from good. What must be the blaze of this star in the Earl of Rosse's telescope, with a speculum of 6 ft., of much higher reflective power!

---

[1] In the present edition the colours taken from Mr. Webb's Manuscript Observation are inserted after those of Σ, and the date is added thus:—yw., blsh., '49.

[2] In the present edition an attempt has been made to complete the list of Double Stars to a certain magnitude. All Double Stars whose primary is above 6·5 (according to the authorities whence the information is taken), and their distances less than 20″, have been added as far as they could be found in the great mass of Double Star Observations now published.

The series comprises many notes on colour and magnitude, the permitted publication of which demands special acknowledgment. These may all in their way be helpful to the student. But, if diligent in the employment of opportunities, he will soon find that, as these pages are but a very limited selection from works of the highest character, so those in turn are powerless to represent even what we can reach of the unspeakable richness and grandeur of the firmament. The Dorpat Catalogue of 3062 double stars was a wonder of accuracy and perseverance: but h. considered that it included less than $\frac{1}{3}$ of the pairs that were obvious in his sweeping: and a large proportion of these are unrecorded still.[1] And yet the sole, or even the chief attraction of the sidereal heavens does not lie in the juxtaposition of two stars, possibly merely accidental, and frequently beyond the reach of any but the most powerful instruments. Many parts of the sky, especially the

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[1] The 'General Catalogue of Double Stars,' by β, contains 13,665 objects. Aitken has discovered at the Lick Observatory 2900 double stars, Hussey at the same observatory and at La Plata 1550, also Jonckheere at Lille has found 1067 and Innes some 1100 at the Union Observatory, S. Africa, and other observers have added to the number. Aitken has laid down limitations as to the term, Double Star, and in the revised scheme the following limits have been suggested:—

Combined mag. not to exceed

9·0	3″
6·0 to 9·0	5
6·0 to 6·0	10
2·0 to 4·0	20
Above 2·0	40

Such a scheme would exclude 61 Cygni, and Krueger 60, θ Persei, Σ 1321, and many others that are known to be physically connected —perhaps even η Cassiopeiæ!

crowded fields of the Galaxy, are full of most interesting and beautiful groups and combinations, of which little or no mention can be found. The attention of the professed astronomer is usually directed into some definite channel, and he has little leisure, and sometimes perhaps not much taste, for that general and indefinite sweeping and 'star-gazing,' which to humbler students becomes a source of boundless delight and wonder. It need not be said that the wishes of the latter class have been chiefly considered in the following pages, though it is hoped they may be of occasional use in other ways.

From a pressure of various employments, the interval since the first appearance of this little work has not added much original matter to the following catalogue. But it is to be hoped that some zealous lover of this great display of the glory of the Creator will carry out the author's idea, and study the whole visible heavens from what might be termed a picturesque point of view. This would involve nothing more than a sufficiency of optical power, of leisure, and of patience bringing with it its abundant reward. By a suitably arranged plan, every part of the sky might be swept over in succession, and the principal instances of intensity of colour, or elegance or singularity of grouping having been noted, the materials would be prepared for a most interesting work—a *Handbook of the Wonders and Beauties of the Starry Heavens.*

A well-adjusted equatorial telescope will readily find anything in the following list from the position there given; otherwise, recourse must be had to a good globe or map. The larger Star-Maps of the Society for the Diffusion of Useful Knowledge were very carefully compiled and of much value in their day, notwithstanding a most inconvenient amount of distortion towards the sides and corners;

but in this respect, though not as regards the minute stars, they are much inferior to the Atlases of Proctor; the smaller of these was specially intended as a companion to the present work, but does not contain the additions made in this impression.[1] The stars, clusters, and nebulæ in the following pages are divided into constellations, which are arranged alphabetically: the boundaries of Heis, in his 'Atlas Cœlestis,' have been followed; but difficulties have often arisen as to objects close on the borders, and they may have been occasionally assigned to a wrong constellation.

Pairs whose connection is ascertained are termed 'binary.' It should be observed that where change is demonstrated it does not necessarily infer binarity, as it may arise from proper motion in one or both components, and binarity is proved by common proper motion where no other change can be detected. In many cases where binarity has been inferred, later measures are given instead of 'Binary' or 'Moving.'[2]

---

[1] Cottam's 'Charts of the Constellations' are admirably suited as a companion Atlas to this work, for objects visible in England. The larger maps (30 × 22 ins.) easily allow of any additions being inserted, but many of the new objects in the present edition will be found there already. The smaller or popular edition has been reduced from the larger by photography. The constellations are delineated separately, and there is an excellent introduction with three key-maps. Norton's Star Atlas for 1920 is a suitable companion to this edition. Backhouse has published a Catalogue of the Magnitudes of Stars visible to the naked eye, giving the results of all previous determinations, thus bringing together in one volume a mass of material, not easily accessible to the amateur.

[2] A 6-in. aperture seems a small affair in these days, yet many of the latest measures given in this edition have been made with that aperture by Mr. Franks, who is doing such excellent work in measuring wide pairs. Mr. Phillips' measures with an 8-in. have

I am indebted to the kindness of G. Knott, Esq., for the following table of the equivalent telescopic star-magnitudes of Smyth, Struve (Σ), Herschel II., and Argelander. It is the result of direct comparison of their respective values of the same objects: those of Argelander being carried below 9·5 m$^{\text{g}}$. by inference.

Sm.	Σ	h.	Ar.
6	5·7	6·4	5·9
6·5	6·3	7·0	6·4
7	6·5	7·4	6·8
7·5	6·9	7·8	7·5
8	7·4	8·2	8·0
8·5	7·9	8·8	8·6
9	8·3	9·5	9·0
9·5	8·9	10·1	9·4
10	9·3	10·4	9·4
11	10·0	11·3	10·0
12	10·4	11·7	10·6
13	10·7	12·5	11·2
14	10·9	13·3	11·8
15	10·9	14·5	12·4
16	10·9	15·9	13·0

A subsequently published collation by Herschel II. of his own magnitudes with those of Σ will form an interesting addition.[1]

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also been found most useful, and some have been made especially for this edition.

[1] The magnitudes of De., often quoted in the following pages, down to 10·3 practically correspond with Σ, but Σ 11·2=De. 10·1 and Σ 12=De. 11·7. The magnitudes of OΣ, and De. are nearly identical. Σ 12, however, equals OΣ 11·35. β's scale=H.'s up to '78, afterwards = Σ. Ar. in his 'Uranometria Nova' and Heis are not subdivided decimally. Pickering by photometric measurements finds that while

The whole subject of magnitudes is, however, in an uncertain and unsatisfactory state ; an assertion which will be borne out by a collation of the best authorities with each other, with themselves on different occasions, and with the sky : and it is with pleasure that we find that stellar-photometry is being seriously taken in hand with the best appliances at the Harvard Observatory.[1]

The *range of visibility* is limited not only by the light of the instrument and the sensitiveness of the eye, but to an extent that could not have been anticipated, by the condition of the air. Burnham has remarked that ‘ an object-glass of 6 in. one night will show the companion to Sirius perfectly : on the next night, just as good in every respect, so far as one can tell with the unaided eye, the largest telescope in the world will show no more trace of the small star than if it had been blotted out of existence.’ Burnham, Ward, Sadler, and others possessed a sight capable of detecting very minute points with small optical means, but with an eye

---

the brighter stars are correctly rated by Ar., the fainter stars are overrated so that 9·2 Ar. = 9·6, 9·5 Ar. = 10·5.

Σ	h.	Σ	h.	Σ	h.	Σ	h.
2·60	3	6·40	7	9·30	11	10·87	15
3·10	3·5	6·85	7·5	9·60	11·5	11·13	19
3·60	4	7·30	8	9·80	12	11·38	17
4·10	4·5	7·70	8·5	10·00	12·5	11·61	18
4·60	5	8·10	9	10·18	13	11·82	19
5·05	5·5	8·50	9·5	10·36	13·5	12·00	20
5·50	6	8·80	10	10·54	14		
5·95	6·5	9·10	10·5	10·71	14·5		

[1] Since these words were written the ‘ Harvard Photometry ’ has been published. This great work contains measures of magnitude of all the bright stars compared with the Pole Star. Also that Observatory has published catalogues of many fainter stars observed photometrically.

and telescope of average quality my experience leads me to believe that the range of a $3\frac{7}{10}$-in. object-glass will terminate among 11 m^g. stars (of Smyth's scale), though from some unknown cause—possibly, as Smyth suggests, peculiarity of hue—smaller ones are sometimes to be caught.[1] Where I have ventured to note any discrepancy as to magnitude, it has been with a view to assist in detecting variations of light: Schr. suggested, and Humboldt is of his opinion, that variability may be the inseparable condition of all light, and the evidence of its probability is continually on the increase. As to estimates of *colour* there is also great uncertainty, arising from the differences of telescopes and eyes, and even of the states of the same eye: still there are limits of disagreement, and it is desirable to fix them, as there seems reason to believe that these colours may change: where there is any such suspicion, comparisons should be multiplied and their circumstances varied. As this is an interesting inquiry, and one suited to amateurs, I had intended to insert many more discrepancies between Smyth's colours and those of other observers; but I ultimately found that a very large proportion may be reasonably referred to the causes just mentioned, and included in the wide margin of those

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[1] Johnson ('Radcliffe Observations,' p. 15) has given the following table, assuming that 1·0 in. will steadily show a star of 8·1 mag.:

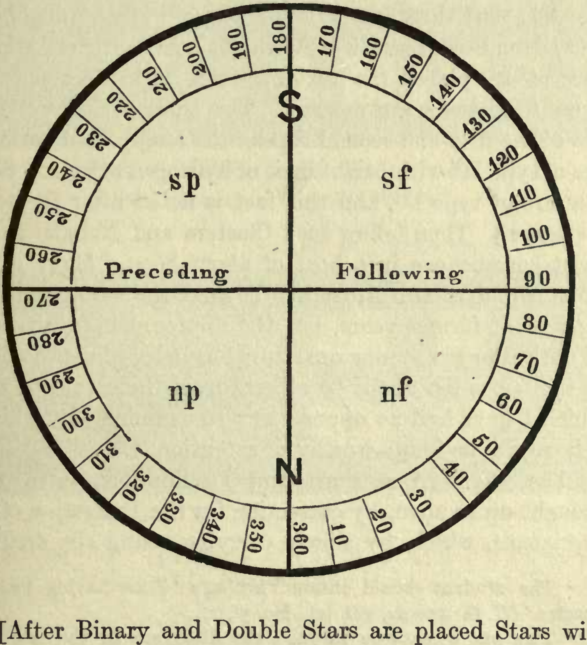
Aperture. In.	Mag.	Aperture. In.	Mag.
1·0	8·1	7·0	12·6
1·5	9·0	8·0	12·9
2·0	9·7	9·0	13·2
2·5	10·2	10·0	13·4
3·0	10·6	11·0	13·6
3·5	10·9	12·0	13·8
4·0	11·3	13·0	14·0
5·0	11·8	14·0	14·2
6·0	12·2	15·0	14·4

individual peculiarities of perception or judgment which astronomers term ‘ personal equation,’ so that a few only have been retained, either where there may be some suspicion of real alteration, or as specimens of the differences to be expected in the inquiry. I have ventured to pass by, from their obvious peculiarity, Sestini’s colours,[1] which caused a re-examination by Smyth, published in his learned and elegant ‘ Ædes Hartwellianæ,’ but I have inserted some by the eminent observer Dembowski, as worthy of the highest confidence ; and, in the present edition, many by modern observers. The colours of all the objects in my list, as well as many others, were carefully compared with the Bedford Catalogue : my original instrument and experience were far inferior,[2] and my eye usually biassed by previous knowledge, so that I was little qualified for such a scrutiny ; but with a great preponderance of agreement or acquiescence, a few discrepancies were noted : dates are added, as the idea of periodical changes of tint involves no impossibility, and has been strongly advocated by Piazzi Smyth. The subject is a curious one, and it would be worth while to record from time to time the colours not only of associated but single stars as they may come under our notice. The *angles of position*, which measure the inclination to the meridian, of the line joining the stars, are given in degrees, with the first decimal. The following diagram, in which the direction of passage through the field is indicated, will sufficiently explain the mode of measurement; the larger being always considered as the central star. The *distances* between the stars (always from centre to centre) are given to seconds with the first decimal place.

---

[1] Sestini’s observations were republished by Hagen in 1911 and reclassified and discussed (*Specola Astron. Vaticana*, III.).

[2] The subsequent great advantage of a 9⅓-in. silvered mirror has been less apparent here than in other respects. My experience concurs with that of Browning, who finds colour decrease with increasing aperture, so as to render stops serviceable, and of Huggins, to whom colour is imperceptible in too much or too little light. Es. and Fr. note the same fact. Es. also finds that in the case of the Red Stars there is a tendency to underrate the brighter and overrate the fainter, and the larger the instrument the more likely is this to occur.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[After Binary and Double Stars are placed Stars with Remarkable Spectra, taken from the new edition of Birmingham's Red Star Catalogue and entered as Es.-Birm. followed by a number. Others are taken from various sources, a large number are derived from the Researches in Spectroscopic Photography undertaken with such brilliant success at Harvard.[1] Stars of type IV are all red; type III, orange red; type II, yellow; type I, and most stars of the bright lined class (type V) are white. It has been shown that in every 1000 stars, 560 are of type I, 374 of type II, 65 of type III, and 1 of type IV. Of type V 108 only are known. The average of the first two magnitudes of each type is I=0·1, II=1·3, III=2·9, IV=6·1, V=8·0. May it not be possible that there is a VI type whose brightest member is yet beyond our reach? [2] With the stars with remarkable spectra are placed the variable stars with their elements from Chandler's Catalogue.[3] The short-period variables are of the first and second types, the long-period variables are of type III with bright lines of hydrogen at max. Some few are of type IV, and this fact is noted after the star's elements.] Then follow such Clusters and Nebulæ as are most conspicuous in a host of about 8000. Many of the great wonders are altogether beyond the 'common telescopes' of former years, but the unprecedented extension of optical power among amateurs has induced me to add to the previous list about 50 objects from the catalogue of h. which I have had no opportunity to examine, but which I believe will be found worthy of attention.

The Right Ascensions and Declinations have been brought up to 1920, by correcting for the Precession of the Equinoxes, which, by slowly carrying round the artificial network of meridians and parallels in front of the immovable heavens, is continually changing the *nominal places* (not the *relative positions*) of the stars. No greater correctness is guaranteed than will answer the purpose of *finding* in a moderate-sized field. Globes and maps admitting of no such reduction will require mental allowance on this account in proportion to their date.

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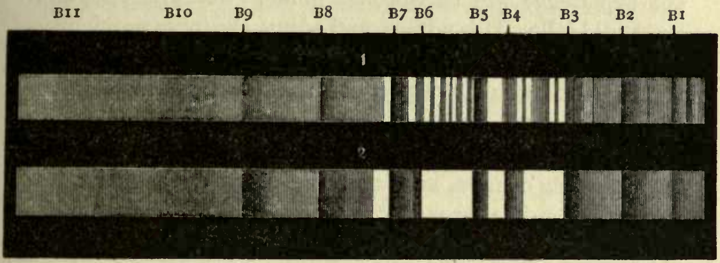
[1] The student should obtain Fleming's 'Stars having Peculiar Spectra' (*H. O. Annals*, vol. lvi., No. vi.).

[2] This has come true through the discovery by the late Mrs. Fleming of a VI type with a spectrum visually like the IV type but photographically different. Average mag. 8·3.

[3] And Harvard 2nd Cat. of Var. Stars, and other sources. It has been found impossible in the present edition to include more than the brightest ones of the enormous number discovered by photography. Over 3000 have been discovered at Harvard alone.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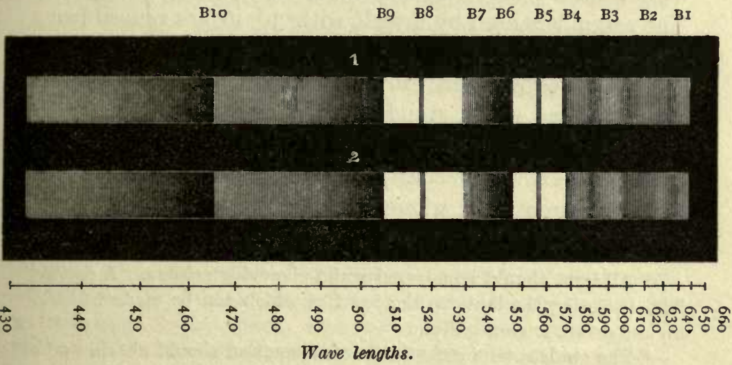
STELLAR SPECTRA OF THE THIRD CLASS.
1 α Orionis, 2 α Herculis (Dunér).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Wave lengths.

STELLAR SPECTRA OF THE FOURTH CLASS.
1, Y Canum Ven.; 2, 19 Piscium (Dunér).

As to optical management; close pairs and crowded clusters gain by increasing the power; so *in general* do dissimilar colours, and very minute points near larger stars; but experience will be the best guide. For difficult pairs we should follow H.'s advice, and adjust the focus previously upon a single star of nearly the same altitude, size, and colour; the peculiar aspect of the double star will be afterwards more striking. Occasionally a slight change, especially lengthening, of focus may relieve a weary eye. In estimating colours, keep near the centre of the field: its edges may not be achromatic.[1] Large nebulæ always require low powers; very small ones must be more magnified to show their nature, and resolvable ones, to insulate their sparkling points. In most cases low powers have the advantage from the beauty and variety of their broad fields. The magnifiers used by myself with $3\frac{7}{10}$ inches ranged from 64 to 250, in a few instances 300.

In the following list, under the head of Double Stars,[2] the *Synonym*, which stands first, is either a Greek letter, which is Bayer's designation; or an Arabic numeral, which (unless otherwise specified) is Flamsteed's; to these are added in parenthesis, where practicable, an Arabic numeral, preceded by *Σ* (the conventional symbol for the name of

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[1] All light should be covered while observing colours. A square box, enclosing the lantern, the front of which can be made to slide up and down, is very useful.

[2] The student who seeks further information should obtain :—

(1) Burnham's 'General Catalogue of Double Stars,' and the Appendix by Jonckheere (at present in the press).

(2) Lewis' 'Measures of Double Stars in Struve's Men. Micr.'—a most valuable and interesting memoir (*R.A.S. Memoirs*, vol. lvi.).

(3) Hussey's 'Memoir on the O*Σ* Stars' (*Lick Observatory*, vol. v.).

(4) Doolittle's 'Memoir on the Ho. Stars' (*Flower Observatory*, vol. iii.).

(5) Cat. of the Orbits of visual Binary Stars (*L.O. Bulletin*, No. 84).

Wilhelm Struve), which refers to the Dorpat Catalogue of Double Stars, or preceded by OΣ (Otto Struve) or β (Burnham), etc. In the class of Clusters and Nebulæ, the prefixed number is that in the General Catalogue of Sir J. Herschel (new edition); to which is subjoined, either M., followed by a numeral referring to Messier's Catalogue of Nebulæ in the 'Connoissance des Temps' for 1783 and 1784; or H., the Roman numeral after which shows the class in the catalogues of that observer. After the Synonym comes the *Place in the Heavens*, given first in hours and minutes and decimal of a minute of Right Ascension, then in degrees and minutes of Declination, marked N. or S, as the case may be; the Italic letters, *n* (north), *s* (south), *p* (preceding), and *f* (following), being employed to indicate the relative positions of neighbouring objects. Next are placed (in the case of Double Stars) the *Magnitudes* in corresponding Arabic numerals separated by a comma. Then follow the *Position-angles*, the *Distances*, and the *Colours*;[1] with occasional remarks from other authorities.

For many descriptions of objects, and directions for finding them, the author is responsible.

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[1] In the present edition, to save space, no colour is given where the stars are called white by Σ. Good service would be done by the amateur who, with sufficient aperture, re-examined all these stars for colour. Mr. Franks has made many valuable observations of the colours of Double Stars. One of the remarkable discoveries of modern times, in Astronomy, is that the type of spectrum (and therefore to some extent the colour), and the velocity of motion are distinctly connected, thus:—

Type B	6·2 km.
„ A	10·5 „
„ F	14·4 „
„ G	15·0 „
„ K	16·8 „
„ M	17·1 „

Abbreviations (additional) and Symbols ;—A., *Aitken ;* Ar., *Argelander ;* B., *Birmingham ;* β, *Burnham ;* Bies., *Biesbroeck ;* D'A., *d'Arrest ;* De., *Dembowski ;* Do., *Doberck ;* Doo., *Doolittle ;* Du., *Dunér ;* Es., *Espin ;* Fr., *Franks ;* Gr., *Grover ;* H., *Sir W. Herschel ;* h., *Sir John Herschel ;* Hh., *Sir John Herschel's Catalogue of his father's Double Stars ;* Ha., *Hall ;* Hn., *Holden ;* Har., *Harvard ;* Ho., *Hough ;* Hu., *Hussey ;* I., *Innes ;* K., *Knott ;* Ll., *Lalande ;* L., *Lacaille ;* L.P., *Lick Photos ;* M., *Messier ;* Ph., *Phillips ;* σ, *The stars in the appendix to Vol. III., Poulkova Observations ;* $O\Sigma$, *Otto Struve ;* $O\Sigma\Sigma$, *Poulkova Cat., Part II. ;* S., *South ,* P. Sm., *Piazzi Smyth ;* Sa., *Sadler ;* Wa., *Ward ;* W., *Webb.*—Bin., *binary ;* c.p.m., *common proper motion ;* r.m., *rectilinear motion ;* bl., *blue ;* blsh., *bluish ;* grn., *green ;* grnsh., *greenish ;* or., *orange ;* y., *yellow ;* ysb., *yellowish ;* w., *white ;* yw., *whitish yellow,* etc. ; o., *no colour given.*—Hy., *Hydrogen lines bright.*

ANDROMEDA.

THIS constellation is rich in interesting objects of every class ; on the meridian, however, it is inconveniently high for an achromatic telescope, and should therefore be examined some hours E. or W. of it, like many other similarly situated regions. Its upper part towards the Galaxy contains very fine sweeping.

As the result of photos through screens with the 60-in. at Mt. Wilson, it seems extremely probable that the faint stars are appreciably redder than the bright ones. The presence of an absorbing medium in space might account for this. But if the stars really belong to the red class, then from the above table it seems probable that many faint stars will have large p.m. Barnard has lately discovered one in Ophiuchus with a p.m. of 10″ annually, which Steavenson finds to be 9 m^g. and red. Its place for 1916 is R. A. $xvii^h\ 53^m\ 44^s$, N. $4^\circ\ 27'{\cdot}4$.

Kapteyn and Eddington have pointed out that all the stars are moving in one of two streams, and Kapteyn believes that the sun belongs to a cluster having an independent motion.

DOUBLE STARS.

Σ 3058. $0^h\ 1^m{\cdot}1$, N. 29° 53′ : 7·7, 9·2 : 49°·9 : 12″·5.—Fr. ’14 : 52°·7 : 14″.

OΣ 547. $0^h\ 1^m{\cdot}4$, N. 45° 22′ : 8·3, 8·3 : 110°·9 : 4″·5 ; rsh. β., 133°·8, ’05. c.p.m.—8′ *s*, a little *p*, is β 997 : 7·9, 8·9 : 339°·7 : 4″·0.

22. $0^h\ 6^m{\cdot}2$, N. 45° 38′ : 5 ; wh. ’38, clear yellow ’50. Guide to elegant pair, Σ 3 : 7·5, 8·5 : 84°·1 : 4″·9.

OΣ 2. $0^h\ 9^m{\cdot}2$, N. 26° 32′ : 6·9, 8·3 : 43°·8 : 0″·9. Hu. 37°·8 : 0″·7 : ’98. Bin., *comes* 9·6 : 225° : 18″.

Σ 17. $0^h\ 12^m{\cdot}4$, N. 28° 51′ : 8, 9·2 : 29°·3 : 26″·3 : y., o. β, *comes*, 11·5 : 266°·5 : 2″·4. In a wide sprinkle.

Σ 24. $0^h\ 14^m{\cdot}3$, N. 25° 41′ : 7·2, 8 : 248°·4 : 5″·2. Bird, minute *comes s*. A pretty pair.

26 (OΣ 5). $0^h\ 14^m{\cdot}5$, N. 43° 20′ : 6·5, 10·2 : 240°·7 : 6″·4. c.p.m.

28 (β1095). $0^h\ 25^m{\cdot}9$, N. 29° 18′ : 5·5, 13·3 : 0°·1 : 2″·4 : c.p.m.

Σ 33. $0^h\ 26^m{\cdot}7$, N. 33° 39′ : 8·2, 8·3 : 205°·5 : 2″·5.

Σ 40. $0^h\ 30^m{\cdot}9$, N. 36° 23′ : 6·8, 8·8 : 312°·2 : 11″·6 : y., ash.

π(OΣΣ 4). $0^h\ 32^m{\cdot}6$, N. 33° 17′ : 4·1, 8·0 : De. 173°·3 : 36″·3 ; ysh., bl., distant 11·5. Fr., pair 5^m *p* ; 6, 9 : y. bl. (h. 5451).

Σ 44. $0^h\ 34^m{\cdot}4$, N. 40° 33′ : 8·3, 9 : 258°·8 : 7″·9. β, 266°·1 : 9″·6 : ’03, from p.m.

δ (β491). $0^h\ 35^m{\cdot}0$, N. 30° 25′ : 3, 12·5 : 299°·3 : 27″·9.

Σ 47. $0^h\ 36^m{\cdot}1$, N. 23° 37′ : 6·7, 8·6 : 204°·7 : 16″·6. Two *comites*.

Σ 52. $0^h\ 39^m{\cdot}7$, N. 45° 48′ : 8, 9 : 25°·8 : 1″·4 : ysh., o. β, 15°·7, ’12.

Σ 55. $0^h\ 40^m{\cdot}1$, N. 33° 11′ : 8, 8·8 : 322°·9 : 2″·1. β, 327°·2 : ’04.

ΣI 1. 0^{h} 42^{m}·1, N. 30° 30′: De., 7·0, 7·3: 53°·7: 46″·4: y. Curious similarity. Fr., *p* deeper, '76. 1½° *f* δ. Gr. small wide pair, 35′ *np*.

Σ 72. 0^{h} 50^{m}·2, N. 38° 44′: 8, 9: 182°·3: 24″·3: ysh. Fr., '14: 177°.

36 (Σ 73). 0^{h} 50^{m}·7, N. 23° 12′: 6·2, 6·8: 307°·8: 0″·8. Ph. 41°·0: 0″·8, '14. Bin., Lewis, 137·5 yrs. Beautiful; strong yellow. Closely *np* η, towards ζ: visible to naked eye.

μ (h. 1057). 0^{h} 52^{m}·3, N. 38° 4′: 4, 16. β 122°·2: 36″·9. Inserted as a light test; depending, however, like others, mainly on atmospheric conditions. D., who rated it 11½, or at most 11¼ of Σ's scale, glimpsed it with 4·8-in. of 8-in. achr. even when his vision was slightly impaired. Wa. has seen it with $4\frac{3}{10}$-achr. I held it pretty steadily in the presence of μ with 9⅓-in spec., so Fr., with 5-in. achr. Buffham glimpsed it with 6½ in. of 9-in. spec. β, a fainter *comes*: 311°·1: 39″·7.

Σ 79. 0^{h} 55^{m}·5, N. 44° 17′: 6, 7: 192°·4: 7″·6: v.w., blsh. w.; 7, grnsh., 9-in. spec. '71, so Fr., '76.

39 (h. 1064). 0^{h} 58^{m}·4, N. 40° 55′: β, 6, 12: 3°·3: 20″·6.

φ(OΣ 515). 1^{h} 4^{m}·8, N. 46° 49′: 4·9, 6·5: 315°·9: 0″·6: y., grn. A., '08: 212°·4: 0″·3. Bin.

β 398. 1^{h} 7^{m}·2, N. 47° 23′: 8, 8: De., 50°·5: 1″·8.

Hu. 523. 1^{h} 15^{m}·8, N. 51° 11′: 6·5, 10: 98°·7: 0″·4.

Σ 112. 1^{h} 16^{m}·0, N. 45° 55′: 8·5, 9: 327°·2: 23″·6: yw. β, 330°·5: 21″·8: '03. *comes* to 9, 14·2: 187°·3: 4″·6.

ω(β 999). 1^{h} 22^{m}·8, N. 45° 0′: 5·3, 12: 100°·2: 2″·3: '92. 96°·0: 2″·6: '02. pair: 10·7, 10·7: 140°·1: 5″, in field *sf*.

Ho. 7. 1^{h} 22^{m}·8, N. 40° 41′: 6, 13: 158°·9: 13″·5.

Σ 140. 1^{h} 34^{m}·3, N. 40° 39′: 8·5, 9·2: 172°·3: 3″·3.

Σ 141. 1^{h} 35^{m}·3, N. 38° 34′ : 8, 8·5 : 300°·6 : 1″·7 : ysh.

Σ 154. 1^{h} 40^{m}·2, N. 43° 18′ : 8, 8·2 : 126°·7 : 5″·2.

Σ 162. 1^{h} 44^{m}·2, N. 47° 30′ : 7, 7·5 : 225°·5 : 1″·9. Coleman, 215°·1 : '99. *comes* 9·7 : 179°·5 : 20″·4. Bird, dark blue.

Σ 3113. 1^{h} 48^{m}·5, N. 44° 15′ : 8·7, 8·7 : 270°·5 : 1″·5.

56 (ΣI 4). 1^{h} 51^{m}·4, N. 36° 52′ : De., 5·7, 5·8 : 301°·4 : 181″·7 : y.—β, 187″·3, '03. *p* larger and ruddier, 1850; nearly equal, *p* redder, 9-in. spec. '71. Whitley, *p* smaller, y., or., '69. Fr., *p* smaller, '76. Es. and β, *comes* 11·4 : 79°·6 : 18″·4. 3^{m} *p* is Σ 179 : 6·7, 7·7 : 160°·4 : 3″·5.

Σ 195. 1^{h} 55^{m}·2, N. 44° 4′ : 8·5, 8·8 : 194°·6 : 3″·1.

γ (Σ 205). 1^{h} 59^{m}·0, N. 41° 51′ : 3, 5 : 62°·4 : 10″·3 : Gold, blue. One of the most beautiful pairs in the heavens. It seems to have been first noticed by C. Mayer in 1788. In 1842 OΣ found the companion double. It forms a binary system with Period of 55 years. The motion is in an elongated ellipse in the direction of 70°. At its greatest elongation the stars are 0″·65 apart, and it is now separating (Ph., 115°·4 : 0″·5 : '14) and should reach its greatest distance about 1916. It forms an admirable test object, but it is important to note the difference between one long disc crossed by a dark interference line, which is sometimes called division, and two round discs with black sky between them.

59 (Σ 222). 11^{h} 6^{m}·0, N. 38° 39′ : 6·7, 7·2 : 34°·8 : 16″·4. Grover, neat pair, 10′ *n p* (h. 1109, β, 172°·7 : 26″·3). Neb.G.C. 828 : 90″ ± *p*.

Σ 228. 11^{h} 8^{m}·9, N. 47° 6′ : 6·7, 7·6 : 262°·1 : 1″·1. Ph., '13 : 110°·7 : 0″·8. Bin.

Σ 245. 11^h 13^m·7, N. 39° 54′ : 7, 8 : 291°·8 : 11″ : yw., blsh. w.

Σ 248. 11^h 16^m·0, N. 42° 25′ : 8·9, 8·9 : 161° : 1″·6 : ysh. β, '04 : 147°·6.

Σ 250. 11^h 16^m·4, N. 37° 3′ : 8·5, 9 : 135°·8 : 3″·2.

Σ 251. 11^h 16^m·8, N. 39° 1′ : 8·2, 9 : 264°·9 : 2″·2 : yw.

σ 70. 11^h 17^m·9, N. 41° 2′ : β, 6·6, 10 : 358°·5 : 53″·3 : y., o. I failed with *comes* '51. Fr. less than 11, '76, but the object guides to a pretty open pair 8 mag. Field fine with low powers. Es., '17 : 6·5, 11 : 1°·6 : 56″·3 from p.m. of 6·5.

2 (β 1147). XXII^h 58^m·9, N. 42° 20′ : 5·7, 8·5 : 323°·4 : 0″·2. A., '12 : 345°·0 : 0″·4. Bin.

Σ 2985. XXIII^h 6^m·3, N. 47° 32′ : 7, 8 : 252°·1 : 15″ : yw., blsh.

8 (β 717). XXIII^h 14^m·0, N. 48° 35′ : 5·3, 12·7 : 161°·8 : 7″·4. c.p.m.

Σ 3004. XXIII^h 16^m·9, N. 43° 41′ : 6·5, 10 : 177°·7 : 13″·1.

Σ 3010. XXIII^h 19^m·6, N. 45° 21′ : 8, 8·7 : 132°·4 : 25″·3 : ysh., c.p.m. Es., *comes* to 8·7 : 11·5 : 103°·6 : 29″·5. 1^m *f*, 2'*s* is A. 788 : 8·8, 14·2 : 270°·4 : 4″·1.

Σ 3024. XXIII^h 28^m·2, N. 43° 23′ : 8·2, 9 : 311°·6 : 4″·9.

OΣ 500. XXIII^h 33^m·6, N. 43° 59′ : 6·1, 7 : 295°·4 : 0″·5 : w., bl. Doo., '02 : 333° : 0″·7. Bin. Curious group, 1^m *f*, 15′ *n*.

β 995. XXIII^h 43^m·6, N. 46° 23′ : 6·2, 10·2 : 243°·4 : 0″·9. A., '04 : 238°·4.

Σ 3042. XXIII^h 47^m·8, N. 37° 27′ : 7, 7 : 89°·3 : 4″·2. Hu., '02 : 88°·1 : 5″·1. Fr., ysh., '76.

Ho. 205. XXIII^h 48^m·0, N. 38° 50′ : 6·5, 12·5 : 179°·7 : 4″·6.

Σ 3043. XXIII^h 48^m·7, N. 38° 14′ : 8·4, 9·2 : 250° : 15″·5. A. divides 8·4 : 8·6, 10·3 : 172°·1 : 0″·3.

Pair. XXIII^h 49^m·0, N. 40° 55′. Es., 6·5, 8·8 : 145°·4 : 51″. Orange, bl.

Σ 3048. xxiii$^{\text{h}}$ 54$^{\text{m}}$·0, N. 23° 54′ : 7·7, 8·8 : 314°·3 : 9″·2 ; yw., o. 8·8 decidedly bl., '50. 12 m$^{\text{g}}$. *comes*, 9-in. and mags. 8, 10 : '71. Fr., quite two mags. diff., '76. Grover, *comes* beautiful blue, '74. c.p.m.

Σ 3050. xxiii$^{\text{h}}$ 55$^{\text{m}}$·4, N. 33° 17′ : 6, 6 : 191° : 3″·8 : ysh. '32. Ph., '14 : 222°·4 : 2″·1. Rect. m.

β 860. xxiii$^{\text{h}}$ 55$^{\text{m}}$·9, N. 38° 25′ : 6·8, 11·6 : 107°·2 : 6″·7.

Stars with Remarkable Spectra, and Variables.

SU (var.). 0$^{\text{h}}$ 0$^{\text{m}}$·3, N. 43° 10′ : 7·2–8·4 : IV : Es.

Es.-Birm. 4. 0$^{\text{h}}$ 15$^{\text{m}}$·7, N. 44° 16′ : 8·2 : R : IV : Du.

R (var.). 0$^{\text{h}}$ 19$^{\text{m}}$·8, N. 38° 8′ : 6·0–14·9 : 410$^{\text{d}}$·7 : At Bonn. F. remarkably bright at max. Es.

Es.-Birm. 10. 0$^{\text{h}}$ 23$^{\text{m}}$·3, N. 35° 8′ : 8·1 : R : IV : Du.

W (var.). ii$^{\text{h}}$ 12$^{\text{m}}$·5, N. 43° 56′ : 6·5–14 : 395$^{\text{d}}$: Anderson.

Es.-Birm. 723*a*. xxiii$^{\text{h}}$ 8$^{\text{m}}$·6, N. 52° 17′ : 8·2 : R : III : Es.

8. xxiii$^{\text{h}}$ 14$^{\text{m}}$·0, N. 48° 34′ : 4·9 : OR : III : Se.

Z (var.). xxiii$^{\text{h}}$ 29$^{\text{m}}$·8, N. 48° 23′ : 9·1–11·4 : showing at Harvard the spectrum of a Nova in 1901. Rose to 8·4 again 1914 with very bright F.

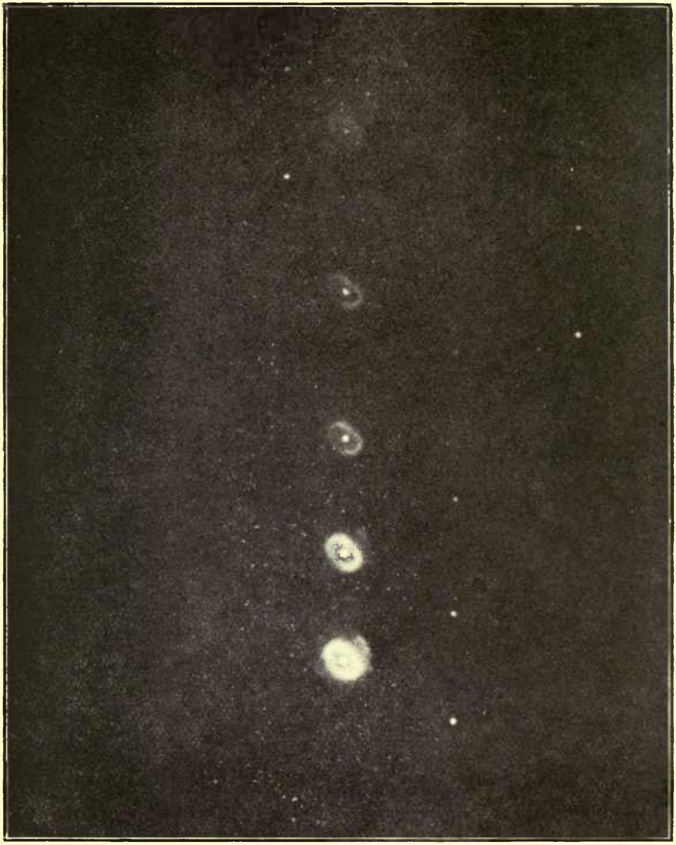
Nebula and Groups.

205 (H. V 18). 0$^{\text{h}}$ 36$^{\text{m}}$·0, N. 41° 14′ : Large faint oval neb. best with low powers : res. by Bond : a very large field includes it with 221 and 224. Seems to sparkle ; much more oval and less spindle-shaped than as drawn by Bond.

224 (M. 31). 0$^{\text{h}}$ 38$^{\text{m}}$·4, N. 40° 50′ : One of the grandest in the heavens ; long, oval, or irregularly triangular, ill-bounded, and brightening to the centre ; so plain to the naked eye that it is strange that the ancients scarcely mention it. It is, however, referred to as a familiar object by the Persian astronomer, Sûfi, in the tenth century. By

moving the telescope rapidly to gain contrast, Bond extended it to the surprising dimensions of 4° in length and 2½° in breadth, of which common instruments show little, and less in proportion to the increase of power. No telescope has been able to deal with its nature ; Bond's $14\frac{19}{20}$-in. found no resolution, though it was seen through a rich stratum containing 1500 stars. It detected, however, two curious dark streaks, like narrow clefts, both beyond any ordinary instruments (but readily shown in photos as dark rings), in which the darker of them forms in reality the boundary of one side of the nebula as seen with a small aperture : both well seen by Se. with $9\frac{9}{10}$-in. achr. : I have caught one with difficulty with 5½-in. achr., '63. Grover has seen both with 6½-in. silvered mirror, and I have traced them through a long extent with 8-in. mirror (With), 1864 ; but this was *after the knowledge of the fact*, which has a great influence upon the eye ; the truth of H.'s remark being often exemplified, that less optical power will *show* an object than was required for its discovery. Huggins finds spectrum continuous, but cut off at the red end.

Modern photos show the spectrum to be of the solar type. Fath at Mt. Wilson finds the spectrum of the Milky Way to be type G, and it has been inferred that this nebula may be an exterior Galaxy. Photos show many stars scattered over and around the nebula. Peace at Mt. Wilson gives its velocity of recession 204 miles per second. A 14 mag. *np* nucleus not always seen, 9-in. A star mag. 7 was detected near the nucleus by Ward, Aug. 19, 1885, and several other observers independently, and subsequently. It faded to 16 mag. Feb. 7, 1890 ; Hall, 26-in. refractor. Es. glimpsed with difficulty on March 6, with 1000 on 17¼-in. Es. thinks nucleus var., and sees star in it, confirmed by



PLANETARY NEBULA, H. IV 18, ANDROMEDÆ.
Photographed at the Lick Observatory, with exposures of 10 *sec.,* 20 *sec.* 30 *sec.,* 1 *min.,* 2 *min.*

Young, 23-in. The spectrum of the Nova resembled the nebula, as was the case with Z Centauri.

221 (M. 32). Is in the same low-powered field: small, but bright. E. of Rosse resolved, so Buffham 9-in.; spect. like M. 31.

404 (H. II 224). Rather faint; but easy with 9⅓ in. spec.; *np* β, strong yellow, in the same field. D'A., strong nucleus. E. of Rosse, resolvable.

Pretty Group (OΣΣ 17). 1^{h} 19^{m}·9, N. 38° 37′.

752 (H. VII 32). 1^{h} 53^{m}·0, N. 37° 17′: Wide, rich region, especially of small stars.

1023 (H. I 156). II^{h} 35^{m}·4, N. 38° 43′: One of H.'s bright class neb., lenticular, 5′ long, with stellar nucleus.

7662 (H. IV 18). XXIII^{h} 22^{m}·0, N. 42° 6′: small, but very bright. La. sees nucleus and two oval rings, confirmed by Lick Photos, 10 sec. exposure showing nucleus and one ring, 20 sec. two rings. The outer ring seems to grow in intensity, as exposure lengthens, much more slowly than inner ring and nucleus. Barnard, nucleus var. 12–15? My 9⅓-in. shows blsh. disc with woolly border, and suspicion of dark centre. Huggins, 8-in.; annular, grnsh. bl.; spect. four bright lines. Three small stars *np*, nearest, 12·6: 63°·2: 51″·3.

AQUARIUS.

A dull-looking constellation, but well repaying telescopic research.

Double Stars.

4 (Σ 2729). XX^{h} 47^{m}·0, S. 5° 54′: 5·9, 7·2: 24°·5: 0″·7: y., '29. A., '12: 324°·6: 0″·5. Bin. P., 135·6 yrs.

7 (β 1034). XX^{h} 52^{m}·6, S. 10° 0′: 6, 11·7: 165°: 2″·1.

12 (Σ 2745). XX^{h} 59^{m}·7, S. 6° 8′: 5·6, 7·7: 189°·6: 2″·7. y., bl. Brightest in vicinity. Fixed.

Σ 2781. xxi^{h} 12^{m}·5, S. 7° 59′ : 7·8, 7·8 : 172°·1 : 3″·3.

β (h. 936). xxi^{h} 27^{m}·4, S. 5° 55′ : 3, β, 10·9 : 318°·9 : 34″·3 : y., *comes* scarcely suspected, $3\frac{7}{10}$. Wa. considers it test for 4½ to 5-in. achr. β, two close pairs, *p*, 10′ *n*.

Ho. 288. xxi^{h} 29^{m}·9, S. 4° 43′ : 6·5, 13 : 277°·9 : 17″.

Σ 2809. xxi^{h} 33^{m}·5, S. 0° 45′ : 6, 8·4 : 163°·5 : 31″·1. Fixed. *f* M2, a little *n*.

24 (β 1212). xxi^{h} 35^{m}·4, S. 0° 25′ : 6·3, 7·1 : 261°·0 : 0″·5. A., 278°·6 : ’04. Bin. Dist. 10·9.

Σ 2817. xxi^{h} 37^{m}·8, S. 0° 2′ : 8·2, 8·5 : 156°·3 : 25″·9.

Σ 2825. xxi^{h} 42^{m}·8, N. 0° 29′ : 8, 8·2 : 100°·2 : 1″·1 : ysh. Do., ’02 : 117°·3.

Σ 2838. xxi^{h} 50^{m}·4, S. 3° 40′ : 6, 8·8 : 185°·2 : 21″·6 : ysh., o. Fr., ’14 : 182°·5 : 18″·7 : ysh., blsh. *comes* 10 mag. pale lilac, ’75. Curious and beautiful stream of small stars *np*.

Σ 2847. xxi^{h} 54^{m}·0, S. 3° 53′ : 7·6, 8 : 296°·6 : 1″·2 : ysh.

h. 5524. xxi^{h} 57^{m}·2, S. 16° 0′ : 6, 9 : β, 292°·1 : 101″·9. Howe, 6 double, β, 11 : 270°·5 : 8″·9.

Σ 2851. xxi^{h} 57^{m}·4, S. 12° 23′ : 8, 8·3 : 120°·8 : 19″·1.

29 (S. 802). xxi^{h} 58^{m}·1, S. 17° 11′ : β, 8, 8½ : 242°·4 : 4″·1. De., 7·0, 7·2. Very little diff. in size : *p* perhaps the smaller, ’49, ’51–3–5 ; pale y., 7½ mag. ’55 ; *p* 0·3 smaller 9-in. ’71. Howe, 6, 6·2 : ’77.

Σ 2862. xxii^{h} 3^{m}·0, N. 0° 10′ : 7·6, 8 : 104° : 2″·3 : ysh., y.

35. xxii^{h} 4^{m}·6, S. 18° 56′ : 6 : β, guide to pair *np* : 8·5, 8·5 : Doo., 58°·3 : 1″·8. (β 170).

41 (H*h*. 753). xxii^{h} 9^{m}·9, S. 21° 28′ : Hall, 6, 8 : 115°·7 : 5″ : Rsh., bl. A 7 mag. to which β adds *comes* 11·2 : 258°·1 : 11″·5, makes it a pretty group.

Σ 2887. xxii^{h} 13^{m}·2, S. 1° 6′ : 9, 9 : 25°·7 : 8″·8. Hu., ’05 : 29°·4.

51 (β 172). xxii^{h} 19^{m}·9, S. 5° 15′: 5·6, 5·7: 12°·1: 0″·7, '91. A., '12: 356°·0: 0″·7. Bin.

53 (H*h*. 762). xxii^{h} 22^{m}·0, S. 17° 10′: Ha., 6, 6: 304°·2: 7″·4. β '00: 6″·9, distant *comes*, at 339°, double 12·9, 13·9: 101°·4: 1″·8. *p* smallest, '49. So Fr., '76. Fr., '16: 312°·3: 7″.

ζ (Σ 2909). xxii^{h} 24^{m}·7, S. 0° 26′: 4, 4·1: 359°·8: 3″·6: grnsh. w.: '25. β., '05: 317°: 2″·9. pale y., '51. A very fine object, easy with very small aperture. In centre of triangle of nearly equal, naked-eye stars. β, pair 44^{s} *f*, 11′ *s*: 8·5, 10·2: 335°·3: 1″·5. (β 76).

Σ 2913. xxii^{h} 26^{m}·3, S. 8° 32′: 7, 8: 331°·9: 8″: w., rsh. 9, 10, 9-in. '71. Fr., 8 (purpsh.), 9; '79.

η. xxii^{h} 31^{m}·2, S. 0° 32′: 1½° *s* is 60, 6 mag., 13′ *s* of which β finds triple 9·5, 10·3, 11: 213°, 225°·6: 2″·6, 28″·8. (β 77).

Σ 2928. xxii^{h} 35^{m}·3, S. 13° 2′: 8, 8: 327°·7: 4″·7. Hu., '02: 312°: 4″·1.

Σ 2935. xxii^{h} 38^{m}·7, S. 8° 44′: 7, 7·8: 313°·3: 2″·6: v.w. 7·8, grey, or blsh. ? '50. So Se., '55; Fr., ysh., blsh.,'76.

τ^{1} (Σ 2943). xxii^{h} 43^{m}·5, S. 14° 29′: 6, 9·2: 112°·2: 30″·7. Fr., '14: 116°·9: 25″·7. p.m.

Σ 2944. xxii^{h} 43^{m}·7, S. 4° 38′: 7, 7·5, 8·4: 246°·9, 157°·5: 4″·1, 55″·8: ysh., w., w. β, '05: 259°·8, 128°·1: 3″·1, 47″·0. 8·4, blsh. '49.

τ^{2} (H*h*. 781). xxii^{h} 45^{m}·4, S. 14° 1′: 5, beautiful or., with dist. *comes* (H., 10 mag.; Fr., 9 mag.) lilac, or blsh.

β 178. xxii^{h} 51^{m}·0, S. 5° 25′: 6, 8: Doo., 324°·7: 0″·8.

Σ 2959. xxii^{h} 53^{m}·0, S. 3° 41′: 6·5, 10·5: 96°·7: 15″·7. β, '06: 105°·7, 12″·7, *comes* to 10·5, 12·5: 92°·5: 10″·6.

Σ 2970. XXII^h 58^m·2, S. 11° 44′ : 8·5, 9 : 35°·3 : 8″·4.

83 (A 417). XXIII^h 1^m·0, S. 8° 6′ : 6, 6 : 61° : 0″·2. dist. 7 mag.

Σ 2981. XXIII^h 5^m·3, S. 9° 16′ : 8·8, 8·8 : 112°·4 : 3″·6.

Σ 2988. XXIII^h 7^m·8, S. 12° 22′ : 7·2, 7·2 : 281° : 3″·7 : ysh.

Σ 2993. XXIII^h 9^m·9, S. 9° 23′ : 7, 7·8 : 177°·9 : 25″·6 : field interesting : c.p.m.

ψ^2 (Σ II 12). XXIII^h 11^m·7, S. 9° 31′ : 4·5, 8·5 : 312°·2 : 49″·6 : v.y., bl. β divides 8·5 : 9·1, 9·2 : 94°·3 : 0″·2, and sees two *comites* 18″ and 63″. Close pair, A. '12 : 103°·6 : 0″·7.

Σ 2995. XXIII^h 12^m·5, S. 2° 2′ : 7·7, 8 : 30° : 4″·6.

94 (Σ 2998). XXIII^h 14^m·9, S. 13° 54′ : 5·2, 7·2 : 345°·1 : 13″·4 : yw., bl. Y. with perhaps rsh. glare, grnsh., '49.

95 (Ho. 199). XXIII^h 14^m·9, S. 10° 3′ : β, 5, 11·8 : 218°·6 : 1″·1 : '90. A., '06 : 203°·1.

96 (h. 5394). XXIII^h 15^m·2, S. 5° 24′ : 5·6, 12 : β, 20° : 10″·3.

97 (Hu. 295). XXIII^h 18^m·5, S. 15° 29′ : 5·5, 6·8 : 84°·4 : 0″·4.

Σ 3008. XXIII^h 19^m·6, S. 8° 54′ : 7, 8 : 273°·3 : 7″·5 : ysh., ash. Ph., '13 : 328°·3 : 3″·5. r. m.

I 1058. XXIII^h 19^m·9, S. 22° 11′ : 6·5, 11·5 : 260° ± 2″.

See 485. XXIII^h 22^m·4, S. 22° 11′ : 6, 12·3 : 130°·9 : 5″·6.

ω^2 (β 279). XXIII^h 38^m·6, S. 14° 59′ : De. 5, 11 : 87°·8 : 5″·7.

107 (H*h*. 807). XXIII^h 41^m·9, S. 19° 7′ : De. 5·3, 6·5 : 139°·9 : 5″·6. w. or ysh., bl. '50. De., both w. Se., red, bl., '55. P. Sm. thinks cols. var. Fr., '16 : 137°·8 : 6″·2 : yw., lilac.

STARS WITH REMARKABLE SPECTRA, AND VARIABLES.

3. XX^h 43^m·5, S. 5° 19′ : 4·2 : OR. : III.

Es.-Birm. 689. XX^h 45^m·2, S. 0° 51′ : 6·8 : OR. : III. D'A.

T (var.). xx$^{\text{h}}$ 45$^{\text{m}}$·7, S. 5° 27′: 6·7–13: 203$^{\text{d}}$·3: Goldschmidt.
π. xxii$^{\text{h}}$ 21$^{\text{m}}$·2, N. 0° 57′: 5: Hy. Har.
S (var.). xxii$^{\text{h}}$ 52$^{\text{m}}$·8, S. 20° 46′: 8–14·2: 279$^{\text{d}}$·7: Ar.
R (var.). xxiii$^{\text{h}}$ 39$^{\text{m}}$·7, S. 15° 44′: 6·2–11: 387$^{\text{d}}$·1: Harding.

NEBULÆ AND GROUPS.

7009 (H. IV 1). xx$^{\text{h}}$ 59$^{\text{m}}$·8, S. 11° 41′. Planetary: somewhat elliptic: very bright for an object of this nature; pale bl.; not well defined in 5$\frac{1}{2}$-ft. achr., but bearing magnifying more like a planet than a common nebula. One of the finest specimens of these extraordinary bodies, to which their discoverer, H., assigned a distinct class. E. of Rosse finds a very thin ray on each side, which I saw with Huggins's 15-in. achr. La. detects within it a bright well-defined elliptic ring. Buffham, 9-in. spec., an opening. Se., who made its diameters 25″ and 17″, saw it sparkle, and thought it a heap of stars. The spectroscope, however, of Huggins reveals the astounding fact that it is a mass of incandescent gas. About 1$\frac{1}{3}$° *p v*, 5 m$^{\text{g}}$.

7089 (M. 2). xxi$^{\text{h}}$ 29$^{\text{m}}$·3, S. 1° 12′. Beautiful round neb. diam. 5′ or 6′, showing with 3$\frac{7}{10}$-in. a granulated aspect, the precursor of resolution. With 9-in. spec. resolution evident the margin seems to diffuse itself away, probably in rays. h. compares it to a heap of fine sand, and considers it to be composed of thousands of 15 m$^{\text{g}}$. stars. Sm. observes that "this magnificent ball of stars condenses to the centre and presents so fine a spherical form, that imagination cannot but picture the inconceivable brilliance of their visible heavens to its animated myriads."

Very curious symmetrical group, ± xxiii$^{\text{h}}$ 12$^{\text{m}}$, S. 4° 58′.

Fine field, *lucida* 7 m$^{\text{g}}$. ± xxiii$^{\text{h}}$ 30$^{\text{m}}$, S. 10° 27′.

AQUILA.

Altair (xix^{h} 46^{m}·9, N. 8° 39′), the lucida of this rich constellation has been thought var., and has a very sensible p.m. Ellison faint pair dist. 80″ at P. 90°. Holmes pair 4^{m} *p* (h. 897): 9, 11: 7″ ±. All the Galaxy here is strewed with pairs and groups of stars.

Double Stars.

A 88. xviii^{h} 34^{m}·2, S. 3° 17′: 7·2, 7·2: Rapid Bin., 12·12 years, distance never greater than 0″·15, *comes*, 14·5: 113°·9: 15″·5.

OΣ 361. xviii^{h} 39^{m}·8, N. 5°34′: 7·5, 8·2: 172°·5: 22″·7.

Σ 2369. xviii^{h} 39^{m}·9, N. 2° 32′: 7·5, 8: 98°·2: 1″·5.

5 (Σ2379). xviii^{h} 42^{m}·3, S. 1° 3′: 5·6, 7·4 (Se., 5, 5: ’55. De., 6·3, 7·3: ’66): 121°·5: 13″·2: w., blsh. W., pale violet, ’50: 6, 8: pale y., ruddy, ’71. Fr., yw. lilac, ’15. Fixed. *Comes* (β, 11·2: 145°·5: 27″·5) missed by all save H., I have on several occasions, ’50–’52, seen it more or less distinctly by averted vision. It rather improves with magnifying: very minute, 9-in. spec. ’71.

A 1887. xviii^{h} 42^{m}·3, S. 10° 13′: 6·1, 14: 255°·2: 3″·3.

Σ 2399. xviii^{h} 45^{m}·4, N. 13° 7′: 8·2, 8·8: 119°·6: 15″·7. 10 mag.: 49°·6: 33″·3.

Σ 2404. xviii^{h} 47^{m}·0, N. 10° 53′: 5·8, 7: 183°·2: 3″·5: y., bl. Cols. remarkable. Fr., 5·8 red., ’78. Fixed.

Σ 2408. xviii^{h} 48^{m}·2, N. 10° 41′: 7·5, 8·7: 96°·6: 2″·3. w., ash.

Σ 2412. xviii^{h} 48^{m}·9, N. 13° 55′: 8·4, 8·5: 53°·3: 1″·3: ysh.

11 (Σ 2424). xviii^{h} 55^{m}·4, N. 13° 31′: 5·7, 9·2: 241°·6: 18″·7: grnsh. w., ash. Y., grnsh. or blsh., ’50. Fr., ’15: 270°·9: 16″·1: yw., bl. Rect. m. A

pretty 10 mag. pair *f* a little *n*: another about 38′ *s*. 14′ *f* is Σ 2426: 6·8, 8·2: 259°·8: 16″·9 (β, *comes* to 8·2, 12·7: 167°·5: 3″·9): rsh. y., grey. 10, 6 m^g., closely *np* 11, stands between two curious groups.

Σ 2425. xviii^h 56^m·1, S. 8° 14′: 6·9, 7·7: 183°·2: 32″·1: ysh., ash. Hu., ’02: 180°·8: 31″·2.

ε. xviii^h 56^m·0, N. 14° 57′: 3·5: beautiful y. Wa. notes triplet *f*; β, 10·2, 10·6, 10·5: 252°·4, 100°·1: 9″·3, 22″·1. 10′ *s* is Σ 2428: 8, 9·8: 288°·6: 6″·4. De., 7·7, 10. Occasionally distinct though long past meridian; ’50; 12 mag.: ’71. A fine field.

Σ 2436. xviii^h 58^m·3, N. 8° 38′: 7·4, 8·1: 309°: 34″·6: yw., blsh. w. β, ’05: 311°·2: 32″·4. p.m.

Σ 2437. xviii^h 58^m·4, N. 19° 3′: 7·8, 8: 80°·8: 1″·1. Bowyer, ’03: 59°·7: 0″·8.

Σ 2434. xviii^h 58^m·6, S. 0° 49′: 7·9 has at 123°·1: 23″·5; double *comes*; 8·4, 10·3: 80°·5: 1″·9. Bies. 53°·4: 1″·3: ’03: Bin.?

Σ 2443. xix^h 0^m·4, N. 14° 39′: 8·2, 8·6: 312°·8: 6″·3. Holmes triple, 30′ N.

Σ 2439. xix^h 0^m·7, S. 7° 16′: 8, 9: 199°·5: 22″.

15 (H*h*. 598). xix^h 0^m·7, S. 4° 9′: 6, 7: β, 208°·3: 37″·2: w., or yw., red lilac. Y., ruddy purple, ’50.

ζ (β 287). xix^h 1^m·7, N. 13° 44′: 3, 12: 56°·9: 5″·6. Has been seen with 9$\frac{4}{10}$-in. achr. A curious stream of stars *np*.

Σ 2446. xix^h 1^m·9, N. 6° 25′: 6·3, 8·3: 154°·4: 10″·1: w., blsh. Triple, nearly in line 8, 10, 14 (Phillips, 11 mag.: 343°·2: 34″·8).

Σ 2447. xix^h 2^m·4, S. 1° 29′: 6·7, 9·1: 345°: 13″·8: β, *comes*, 14; 190°: 13″·9.

Σ 2449. xix^h 2^m·5, N. 7° 1′: 7·1, 7·8: 292°·3: 8″.

β 1204. xix^{h} 8^{m}·1, N. 2° 29′ : 7·7, 8·5 : 3°·8 : 0″·4, four 14 mag. *comites ;* a distant 11 mag. makes Σ 2476 : 214° : 31″·5.

β 139. xix^{h} 9^{m}·0, N. 16° 43′ : De., 6·7, 8·0 : 139°·5 : 0″·7. Distant 7·5 yellow, and several faint stars.

OΣΣ 178. xix^{h} 11^{m}·7, N. 14° 57′ : 5·5, 7·5 : 267°·8 : 89″·6. 6, 8 : y., pale lilac, *np* of two 6 mag., the other is Σ 2489 : 6·5, 9·5 : 349°·5 : 8″·2 : w., o. (Fr., bl.). Very delicate.

OΣ 370. xix^{h} 13^{m}·2, N. 9° 12′ : 7·5, 8·2 : 14°·6 : 19″·6 : redsh., blsh. Fixed.

23 (Σ 2492). xix^{h} 14^{m}·5, N. 0° 56′ : 5·5, 9·5 : 11°·1 : 3″·4 : y., bl. H. and Sm. found *comes* increasingly visible with higher powers, which struck me independently. Not perceived with 80, it was distinctly seen with 144. β, *comes* 13·7, 60°·6 : 12″·5.

Σ 2494 rej. xix^{h} 15^{m}·3, S. 6° 47′ : Fr., ’15 : 7, 10 : 82°·2 : 25″·7 : ruddy or., bl. Fine colours.

28 (OΣΣ 179). xix^{h} 15^{m}·9, N. 12° 13′ : De., 5·8, 8·2 : 175°·2 : 60″·3 : y., azure. 6, 9 : y., lilac ? : ’55.

Σ 2497. xix^{h} 16^{m}·1, N. 5° 26′ : 6·9, 8 : 358° : 30″ : ysh., w. A fine object. Fixed.

Σ 2498. xix^{h} 16^{m}·2, N. 3° 53′ : 7·2, 7·8 : 66°·7 : 12″·2 : y., purpsh. Fixed.

26. xix^{h} 16^{m}·3, S. 5° 34′ : 5 m^{g} serves as a guide to h. 881, 2^{m} 25^{s} *p* : 7·5, with double *comes* (9·5, 9·5, Doo., 306°·9 : 6″·9) at 340°·6 : 33″·2. Or. and two blue. Ho, *comes* to 7·5, 12·2 : 61°·2 : 15″·7.

Σ 2510. xix^{h} 19^{m}·5, N. 9° 21 : 8·5, 8·5 : 181°·7 : 8″·7 : A., doubles A. : 8·4, 9·6 : 195° : 0″·2.

Σ 2513. xix^{h} 21^{m}·0, N. 2° 17′ : 8·2, 8·8 : 313° : 2″·2 : yw.

Schj. 22. xix^{h} 23^{m}·7, S. 12° 18′ : 7, 7 : De., 317°·7 : 1″·4 : Doo., 338°·3 : 1″·8 : ’05. Bin.

Σ 2519. xix$^{\text{h}}$ 23$^{\text{m}}$·8, S. 9° 42′ : 8, 8·1 : 124°·2 : 11″·2.

Σ 2533. xix$^{\text{h}}$ 26$^{\text{m}}$·0, S. 0° 37′ : 7·2, 9 : 212°·2 : 23″·2.

Σ 2532. xix$^{\text{h}}$ 26$^{\text{m}}$·2, N. 2° 44′ : 6, 10·2 : 5° : 34″·9. (β, ’05 : 33″·6) : gold, o. *Comes* readily visible ’50, ’55, even considerably out of focus, and several hours past meridian, or. and gr. De., 10, ’66 : K., 11–12, ’71. A pretty pair, very unequal, *np* (Σ 2531 : 7·8, 9·7 : 29°·8 : 31″·4).

Σ 2537. xix$^{\text{h}}$ 29$^{\text{m}}$·4, S. 4° 21′ : 8·3, 8·7 : 130° : 19″·1.

μ (β 653). xix$^{\text{h}}$ 30$^{\text{m}}$·2, N. 7° 13′ : 4·5 : has double *comes* (12·3, 13 : 195°·7 : 5″·1) at 274°·9 : 21″·4.

37. xix$^{\text{h}}$ 30$^{\text{m}}$·7, S. 10° 44′ : 5·5, has within about 1° *f* 30′ *n*, three pairs. Σ 2541 : 8·2, 9·8 : 340° : 2″·8 : y., o. (β 330°·6 : 4″·2 : ’03). Σ 2545 : 6·2, 8·1 : 315°·2 : 3″·5 : w., bl., with dist. *comes*, var. ? Σ 2547 : 7·7, 9 : 332°·3 : 20″·7 : w., and a star with minute double *comes* (β, 10·3, 11·1 : 286° : 4″·3), *np* Σ 2545.

χ (OΣ 380). xix$^{\text{h}}$ 38$^{\text{m}}$·8, N. 11° 38′ : 6, 7 : 74°·3 : 0″·5 : y., v.y. Fixed.

Σ 2562. xix$^{\text{h}}$ 38$^{\text{m}}$·9, N. 8° 11′ : 6·5, 8·2 : 252°·6 : 27″·2 : yw., ash : several minute points near, 9-in. spec., *comes* 10 m$^{\text{g}}$, closely *sp*. 1° *p* lies a pretty pair, 9·5, 11 : and again, not far *sp* a very fine field.

Σ 2567. xix$^{\text{h}}$ 40$^{\text{m}}$·4, N. 12° 11′ : 7·7, 9·5 : 315°·7 : 18″·1.

Σ 2570. xix$^{\text{h}}$ 41$^{\text{m}}$·2, N. 10° 35′ : 7·3, 9·5 : 276°·2 : 4″·1.

h. 895. xix$^{\text{h}}$ 41$^{\text{m}}$·8, N. 1° 3′ : β, 8·7, 10·5, 9·1 : 207°·7, 16°·8 : 14″·2, 28″·5 : *comes* to 9·1, 13·7 : 124°·2 : 4″·6. Three pairs here in a line, and three more further off, all 9 mag. white.

γ. xix$^{\text{h}}$ 42$^{\text{m}}$·5, N. 10° 25′ : 3 : very fine y., Beautiful field with a curious double-curved row of stars a little *s*. 3′ *s* is β 55 : 9·6, 9·7, 9·6 : 28°·3, 260°·6 :

3″·7, 33″·3: all seen by Wa. with $4\frac{3}{10}$-in. achr. It is now brighter than β, which may imply a change in one of the stars; though in many instances Bayer, who affixed the Greek letters in 1603, seems not to have been entirely influenced by m^g. δ (with several delicate *comites*) is in a beautiful neighbourhood.

Pair. xix^h 44^m·1, N. 9° 50′: 8·5, 9·5: est. 300°: 50″: pale or. red, pale y.

π (Σ 2583). xix^h 44^m·9, N. 11° 37′: 6, 6·8: 120°·7: 1″·5: ysh. (Ph., '14: 114°·2:) y., green, '50. Sm., pale w., grnsh, '36. Se., y., bl., '55. De., both w., '64; red. w., azure w., '69. Fr., as Σ, '79, great divergence as to cols. Not single 80, very close 144, good test. $5\frac{1}{2}$-in. showed 14 mag. star *np*.

Σ 2587. xix^h 47^m·5, N. 3° 53′: 6·5, 9·2: 98°·6: 4″·1: gold, o.

Σ 2589. xix^h 48^m·5, N. 0° 26′: 8, 8·4: 297°·6: 5″·1.

Σ 2590. xix^h 48^m·5, N. 10° 9′: 7·1, 10: 309°·2: 13″·5. W., '64: pale or., bl., '65. Sa., v. w., '74, light test moderate apertures. Minute pair *p*, a little *s*. Doo., 10·5, 11·5: 45°·6: 10″·9, also another: 11·6, 12·2: 271°·9: 6″·6. All the three, in same low-powered field.

Σ 2591. xix^h 49^m·3, S. 6° 13′: 7·5, 8·5: 108°·6: 29″·2: yw., w.

57 (Σ 2594). xix^h 50^m·3, S. 8° 28′: 5·2, 6·2: 171°·1: 35″·6: v. w. Distinctly contrasted, '51; pale y., pale lilac, cols. entirely diff., '55; a totally independent obs., as I had not identified the object; pale y., blsh. or grnsh., certainly unlike, 9-in., '71. K., w., v. pale bl. '71. De., yw., azure w., '72. Sa., as K., '75. Fr., ysh. w., blsh., or lilac, '76. Should be watched as two of first observers have attested the similarity of cols.

Σ 2596. xix$^{\text{h}}$ 50$^{\text{m}}$·4, N. 15° 5′ : 7·2, 8·6 : 353° : 2″·1 : ysh., ash. β, ’05 : 327°·8 : 1″·9.

β 659. xix$^{\text{h}}$ 50$^{\text{m}}$·8, N. 6° 56′ : 6½, 12·5 : 317°·3 : 12″·3.

Σ 2597. xix$^{\text{h}}$ 51$^{\text{m}}$·0, S. 6° 57′ : 6·9, 8 : 92°·1 : 1″·9. Bies., ’03 : 89°·1 : 1″·1. c.p.m.

β (Lamont). xix$^{\text{h}}$ 51$^{\text{m}}$·4, N. 6° 13′ : OΣ, 3·4, 11·3 : 17°·1 : 12″·4 : ’52. β, ’04 : 13°·6. c.p.m.

Σ 2612. xix$^{\text{h}}$ 57$^{\text{m}}$·5, N. 6° 42′ : 7·8, 8·8 : 52°·8 : 36″·6. (β, ’01 : 38″·9).

Σ 2613. xix$^{\text{h}}$ 57$^{\text{m}}$·6, N. 10° 31′ : 7, 7·2 : 350°·7 : 4″·7 : yw.

Σ 2618. xix$^{\text{h}}$ 59$^{\text{m}}$·8, N. 15° 14′ : 8·6, 8·9 : 115°·5 : 5″·3.

Σ 2621. xx$^{\text{h}}$ 0$^{\text{m}}$·7, N. 9° 1′ : 7·7, 7·9 : 222° : 5″·7.

β 57. xx$^{\text{h}}$ 1$^{\text{m}}$·8, N. 15° 16′ : De., 6·1, 10·6 : 118°·9 : 2″·3. 2$^{\text{m}}$ *f*, 34′ *n* is Σ 2609 rej. : De., 7·2, 10·3 : 187°·8 : 9″.

Σ 2628. xx$^{\text{h}}$ 4$^{\text{m}}$·0, N. 9° 10′ : 6·1, 8·2 : 349° : 4″·5 : yw., purp.

Σ 2634. xx$^{\text{h}}$ 5$^{\text{m}}$·9, N. 16° 34′ : 8, 9·5 : 13°·7 : 6″·4 : yw., bl. H., red, deeper red ; but he was partial to red tints. I thought 8 w., ’50 ; so De. (7·5, 9·2), ’67, and Fr., ’76.

Pair. xx$^{\text{h}}$ 7$^{\text{m}}$·0, N. 9° 57′ : 5, 10 . pale ruby, bl. Very pretty. Ph., 282°·6 : 35″·2 : 9·2, 10·5, another 4′ *s.*, 358°·7 : 14″·93 : 10, 11·2.

H*h*. 671. xx$^{\text{h}}$ 7$^{\text{m}}$·2, S. 0° 22′ : Σ, 7·5, 8 : β, 206°·2 : 55″·4. ysh., blsh., ’50, ’71. 1° *n* of *θ*.

Σ 2636. xx$^{\text{h}}$ 7$^{\text{m}}$·4, S. 4° 50′ : 8·2, 9·2 : 201°·8 : 12″·5.

Σ 2646. xx$^{\text{h}}$ 10$^{\text{m}}$·1, S. 6° 18′ : 7, 8·8 : 51°·6 : 24″·7. β, ’05 : 47°·3 : 21″·9 : from p.m.

Σ 2651. xx$^{\text{h}}$ 10$^{\text{m}}$·2, N. 15° 55′ : 8, 8 : 279°·9 : 1″·6.

OΣΣ 202. xx$^{\text{h}}$ 10$^{\text{m}}$·3, N. 6° 21′ : De., 6·9, 7·3 : 192°·9 : 43″·4 : w. ? W., bl., ’71. K., both w., ’71. Sa., coarse pair, *s.f.*

Σ 2654. xx$^{\text{h}}$ 11$^{\text{m}}$·0, S. 3° 45′ : 6·2, 7·7 : 233°·9 : 13″·9 : w. 8, 9 : y. ? bl. ? ’55 : De., 6·5, 7·7.

Σ 2661. xx^h 15^m·7, S. 2° 30′ : 7·5, 8·7 : 342°·4 : 24″·3 : w. Fr., 8·7, lilac, '76.

Σ 2670. xx^h 18^m·5, N. 16° 7′ : 8·3, 8·7, 10·7 : 151°·3, 77°·7 : 30″·6, 16″·5 : yw., o.

Σ 2677. xx^h 20^m·6, N. 0° 49′ : 6, 10·5 : 28°·8 : 33″·1. *Comes* steady with 3$\frac{7}{10}$-in., a good test. De., 10·3. *s* of two 7 m^g. stars, the other fine or.

Σ 2679. xx^h 20^m·8, N. 19° 19′ : 7·4, 8·7 : 79°·8 : 21″·9. Fr., '14 : 23″·1.

S 749. xx^h 23^m·3, S. 2° 22′ : Σ, 7·2, 8·2 : β, 189°·8 : 59″·6. W., grey ; '50, '55 ; so Sa., '75 ; Fr., pale y., greyish w., '76. Each has a faint *comes*. Field, if large, very fine.

69. xx^h 25^m·1, S. 3° 9′ : 5 m^g. has a pretty triangle *s p*, one of which is 68, 7 m^g.

Pair. xx^h 30^m, N. 1° 8′ : 7, 9–10 : wide ; or., blue, *s* in a triangle. Ph., 8·5, 11·0 : 359°·6 : 29″·7.

Stars with Remarkable Spectra, and Variables.

T (var.). xviii^h 41^m·9, N. 8° 39′ : 8·8–10 : irr. : Winnecke.

Es.-Birm. 576. xviii^h 53^m·5, N. 0° 21′ : 9·2 : R. Bond. IV ? Es.

Es.-Birm. 578. xviii^h 54^m·9, N. 14° 15′ : 9·0 : R. Lamont. IV Du. Es., var.

V (var.). xix^h 0^m·1, S. 5° 48′ : 6·5 to 8 : Knott. IV.

R (var.). xix^h 2^m·5, N. 8° 6′ : 5·8<12 : 355^d : Bonn.

U (var.). xix^h 25^m·0, S. 7° 13′ : 6·2–6·9 : 7^d : Sawyer.

Es.-Birm. I. 507. xix^h 29^m·8, N. 5° 17′ : 6·9 : red or. B. III : D'A.

η (var.). xix^h 48^m·4, N. 0° 48′ : 3·5–4·7 : 7^d 4^h 14^m Pigott. Type II.

Star. xix^h 57^m·3, N. 9° 17′ : 8·7 : IV : Pickering.

S (var.). xx^h 7^m·9, N. 15° 21′ : 8·4–11·8 : 146^d·7 : Baxendell.

CLUSTERS AND NEBULA.

6705 (M. 11). xviii^h 46^m·6, S. 6° 22′. Noble fan-shaped cl., "magnifica innumerabilium stellarum coacervatio" (D'A.); at the upper edge of the broad luminous cloud which marks the shield of Sobieski. Sm. compares it to a flight of wild ducks. H., stars 11 m^s. divided into 5 or 6 groups, noted independently with 5½-in. An 8 m^s. star is a little within its apex; an open 8 m^s. pair *sf* beyond it. H., just visible to naked eye. Sometimes placed in Scutum Sobieskii. Ellison notes "dark structures" plainly visible.

6709. Beautiful wide group, xviii^h 47^m·7, N. 10° 15′, 9·5–11 m^s.

6724 (h. 2024). xviii^h 53^m·3, N. 10° 15′. Interesting field.

6781 (H. III 743). xix^h 14^m·6, N. 6°23′. Large round faint neb., h. plan. E. of Rosse ring or spiral.

Curious line of 4 stars 8 m^s., ± xix^h 22^m, N. 12° 14′.

Wide group, ± xix^h 25^m, N. 11° 32′.

Long narrow trapezium, xx^h 9^m·9, N. 16° 1′.

ARGO NAVIS.

A constellation of vast extent, the most brilliant objects of which are invisible in England. The great nebula seems to be the centre from which Helium stars radiate in one direction into Scorpio, in the other to Orion, following the preceding branch of the Milky Way. The Bifurcation of the Milky Way commences in Argo, and while the Helium stars take the preceding section, the V-type stars take a central position, and other especial Galactic objects take the following:—The V-type stars abound in the South of Argo, and their mean deviation from the central circle of the

Galaxy is less than 2°. A similar distribution is found in the great Megallantic Cloud. A probable explanation of the Galaxy is that of two circles of stars which may be characterized, one as containing Helium stars, the other Gaseous neb., etc., intersecting in Argo, and again in Cepheus. We may not look upon them, however, as unrelated, but rather as strata of one epoch, differing in arrangement of material. The vast constellation has been subdivided into puppis, carina, malus, etc., but it is thought better to include all the objects under "Argo."

DOUBLE STARS.

β 578. VII^h 23^m·6, S. 17° 42′ : 6·5, 11·8 : Doo., 45°·5 : 2″·3.

Σ 1101. VII^h 25^m·1, S. 13° 39′ : 9, 9 : 89°·3 : 6″·2.

Σ 1104. VII^h 25^m·7, S. 14° 49′ : 6·7, 8·3 : 292°·4 : 2″·3. Jouffra, '03 : 332°·4 : R.M. Two dist. *comites*.

H*h*. 269. VII^h 30^m·9, S. 23° 18′ : Wilson, 6, 6 : 109°·6 : 9″. w., or pale y., '51, '56 *np* rather larger; so Se., (red, blue) '56; Gore, '75. Howe pair 14′ *s* : Wilson, 8, 9 : 203°·8 : 1″·8.

Σ 1121. VII^h 32^m·9, S. 14° 18′ : 7·2, 7·5 : 304°·7 : 7″·5 : w. 33 sec. *p* is Σ 1120 : 6·5, 9·5 : 35°·3 : 19″·6.

κ(h. 273). VII^h 35^m·5, S. 26° 37′ : β, 4·1, 4·1 : 318°·5 : 10″. w. or pale y. '51. β *comes* to B : 229°·3 : 6″·5 : 13·8m^g.

See 84. VII^h 36^m·7, S. 19° 28′ : 5·8, 11 : 287°·4 : 9″·3.

2 (Σ 1138). VII^h 41^m·8, S. 14° 30′ : 6·2, 7 : 339°·2 : 16″·5; w., pale bl., '51. In field with 4, 5 m^g. pale y. About 1° 20′ *s* a wide pair (K., 6·4, 6·4 : 310°·7 : 128″) deep or. '64.

5 (Σ 1146). VII^h 44^m·2, S. 12° 0′ : 5·3, 7·4 : 17°·5 : 3″·3 : ysh., bl. Pale y., ruddy, '51. So Fr., '77 : c.p.m.

ξ (β 1063). VII^h 45^m·9, S. 24° 39′ : 3·7, 13·8 : 188°·7 : 4″·6.

See 87. vii^h 46^m·2, S. 19° 59′ : 6, 14·8 : 144°·5 : 4″·5.

9 (β 101). vii^h 48^m·1, S. 13° 41′ : De., 5·6, 6·7 : rapid bin. β, 23·3 yrs. In 1921 it will be at its greatest distance : 0″·6 at 294°·3. A., ’12, 76°·1 : 0″·2, angle increasing.

11. vii^h 53^m·4, S. 22° 40′ : 4·9 : guides to a beautiful triangle. B.

See 95. vii^h 59^m·0, S. 20° 6′ : 6·5, 14 : 191°·6 : 13″·8.

β 203. vii^h 59^m·3, S. 27° 20′ : 7, 9 : 245°·1 : 7″·1.

Σ 1178. viii^h 0^m·0, S. 12° 59′ : 9, 9 : 330°·1 : 4″·8.

Ho. 352. viii^h 5^m·8, S. 16° 1′ : 6, 12·7 : 185°·4 : 5″·3.

19 (β 1064). viii^h 7^m·6, S. 12° 41′ : 6, 12·5 : 244°·2 : 2″·3, distant 14 mag., and more distant 9 mag.

I. 489. viii^h 27^m·9, S. 19° 18′ : 5·4, 5·8 : 107°·9 : 0″·5.

β 207. viii^h 35^m·1, S. 19° 27′ : De., 6·5, 10·5 : 103°·6 : 4″·3. 6·5 red.

β 208. viii^h 35^m·1, S. 22° 27′ : 6, 9 : 30° : 1″·4. A., ’12 : 192°·3 : 0″·6. Bin., with p.m. of 0″·5 annually.

See 106. viii^h 41^m·2, S. 23° 30′ : 6, double *comes* (12, 12·7 : 333° : 3″·2) at 224°·4 : 17″·5.

Innes. ix^h 4^m·5, S. 25° 32′ : 4·8, 10·3 : 262°·8 : 2″·1.

β 410. ix^h 6^m·3, S. 25° 29′ : 7·6, 8·6 : 161°·2 : 1″·7.

ε (h. 4183). ix^h 6^m·6, S. 30° 3′ : 6½, 9½ : Wilson, 157°·1 : 17″·7.

Innes. ix^h 18^m·0, S. 25° 37′ : 4·9, 9·9 : 60° ± 2″·5.

Jacob 5. ix^h 23^m·3, S. 28° 26′ : β, 6·3, 7·1 : 244°·8 : 1″.

See 113. ix^h 26^m·4, S. 26° 14′ : 6, 14·8 : 178°·1 : 4″·1.

Ho. 371. x^h 2^m·2, S. 30° 29′ : 6·5, 12 : 40°·6 : 6″·4.

h. 4321. x^h 25^m·9, S. 30° 12′ : 6, 10 : Jacob, 225°·4 : 10″·6.

Stars with remarkable Spectra, and Variables.

Es.-Birm. 232. vii^h 22^m·5, S. 20° 48′ : 8 : β. III ? Es.

Es.-Birm. 238. vii^h 30^m·3, S. 14° 22′ : 5·8 : B. III. Du.

o Puppis. vii^h 44^m·8, S. 25° 42′ : 5·3 : Hy. Fleming.
Es.-Birm. 253. vii^h 46^{m}2, S. 13° 53′ : 7·2 : Yr. Kon.
U (var.). vii^h 57^m·3, S. 12° 38′ : 8·5–14·5 : 315^d. Pickering.
RU (var.). viii^h 4^m·1, S. 22° 40′ : 8·6– ? : IV. Fleming.
Es.-Birm. 268. viii^h 21^m·6, S. 23° 47′ : 5·8 : R. Sm. III.
S (var.). ix^h 27^m·9, S. 28° 11′ : 6·3–6·8 : 0^d·324. Paul.

CLUSTERS AND NEBULA.

2409. vii^h 28^m·2, S. 17° 1′ : brilliant group, 8–10 m^g.

2422 (H. VIII 38). vii^h 32^m·9, S. 14° 18′. Grand broad group, visible to the naked eye, too large even for 64 ; some brilliant 5 or 6 m^g. stars, including Σ 1121, which see *supra.* About 2½° *f* is a group round 4, 5 m^g. A fiery 5 m^g. (B. 7 m^g.) leads the region (Es.-Birm. 238).

2437 (M. 46). vii^h 38^m·1, S. 14° 38′. Beautiful circular cloud of small stars (H. 10 m^g.) about ½° in diam. : a little *p* the group round 4, nearer to it than 2422. 2438, a feeble neb. on its N. verge is in La.'s 20-ft. refl., ' an astonishing and interesting object ' ; he and E. of Rosse see it annular : so Buffham, 9-in. ' With.'

2440 (H. IV 64). vii^h 38^m·3, S. 18° 1′. Plan. neb. bright ; pale blsh. w. ; H., 12″ or 15″. With my 64, like a dull 8 m^g. star : with more power, small, brilliant, undefined, surrounded with a little very faint haziness. In a glorious neighbourhood. E. of Rosse, a red star 9–10 m^g. *f.*

2447 (M. 93). vii^h 41^m·2, S. 23° 4.′ Bright cl. in a rich neighbourhood. H., 8–13 m^g.

2482. vii^h 51^m·5, S. 24° 5′ : very rich, 10–12 m^g.

2506 (H. VI 37). vii^h 56^m·1, S. 10° 22′. Fine broad starry cloud, from 10 m^g. down to mere nebulosity ; much better with 64 than higher powers. Vicinity gorgeous.

2539 (H. VII 11). viii^h 7^m·0, S. 12° 34′. Large loose cl. of stars, chiefly about 10 m^g., closely *np* 19, a 6 m^g. yel.

(bright or.) star, attended by a fine group. 19 seems larger than 6 m^g. to my unaided eye.

ARIES.

Three stars near together mark it to the naked eye, but it reaches some way further E. into a dull region.

Double Stars.

Σ 145. $1^h\ 36^m{\cdot}8$, N. 25° 20′ : 6, 10·6 : 31°·6 : 11″·3 : y.o.

1 (Σ 174). $1^h\ 45^m{\cdot}7$, N. 21° 53′ : 6·2, 7·4 : 170°·5 : 2″·6 : gold, v. bl. Y., bl., '49, 80 just divides this beautiful pair.

Σ 175. $1^h\ 46^m{\cdot}6$, N. 20° 43′ : 8·2, 8·5 : 327°·9 : 10″·4. β, '03, 348°·5 : 16″·8 : p.m.

Σ 178. $1^h\ 47^m{\cdot}8$, N. 10° 25′ : 7·8, 7·8 : 193°·3 : 3″·1. Acocks, '14 : 198°·9.

γ (Σ180). $1^h\ 49^m{\cdot}1$, N. 18° 54′ : 4·2, 4·4 : 359°·9 : 8″·6 : v.w. yw., '47. Disc. by Hooke in following comet of 1664. 'I took notice that it consisted of two small stars very near together ; a like instance to which I have not else met with in all the heavens.' β finds star at 84° : 223″ double, 8·9, 13·2 : 23°·8 : 1″·5 (β 512). Lewis 1, $39^s{\cdot}5$ *f* γ., 8′ *s* : 9, 10 : 65°·7, 6″·1.

λ (OΣΣ 21). $1^h\ 53^m{\cdot}5$, N. 23° 13′ : De., 4·7, 6·7 : 46°·2 : 37″·9 : w., olive, or azure. Y., blsh., '48 : y. grnsh., '49. Whitley : 6·7, rsh. lilac, '63, c.p.m.

Σ 194. $1^h\ 54^m{\cdot}8$, N. 24° 27′ : 8, 8·3 : 264°·1 : 1″·2 : yw.

Σ 196. $1^h\ 55^m{\cdot}1$, N. 20° 38′ : 8·5, 11, 9·2 : 55°·5, 167°·4 : 2″·4, 39″·5. β, '03, 49°·5 : 165°·1.

Σ 200. $1^h\ 57^m{\cdot}2$, N. 23°·43′ : 8·5, 9 : 124°·2 : 8″.

10 (Σ 208). 1^h $59^m{\cdot}2$, N. 25° 33′ : 6·2, 8·4 : 25°·2 : 2″ : y., ash. A., ’12, 93°6 : 0″·4. Bin. B. triplet in field *sf.*

Σ 212. $11^h\ 1^m{\cdot}8$, N. 24° 44′ : 8, 8·5 : 165°·9 : 2″.

11 (Ho. 312). $11^h\ 2^m{\cdot}3$, N. 25° 20′ : 6·5, 12 : 330°·1 : 1″·1.

14 (OΣΣ 23). $11^h\ 4^m{\cdot}8$, N. 25° 34′ : 4·9, 8·5, 7·7 : β, 36°·7, 278°·3 : 93″·3, 105″·7.

Σ 224. $11^h\ 6^m{\cdot}6$, N. 13° 18′ : 7·5, 8 : 242°·4 : 5″ : yw., w.

Σ 237. $11^h\ 11^m{\cdot}4$, N. 10° 24′ : 8·4, 8·7 : 238°·5 : 14″·6.

Σ 240. $11^h\ 12^m{\cdot}7$, N. 23° 30′ : 7·7, 8·2 : 48° : 4″·7.

Σ 244. $11^h\ 13^m{\cdot}0$, N. 21° 52′ : 8·8, 9 : 289°·8 : 4″·4.

Σ 261. $11^h\ 20^m{\cdot}0$, N. 11° 8′ : 8·6, 8·7 : 249°·2 : 3″ : yw.

Σ 271. $11^h\ 25^m{\cdot}9$, N. 24° 53′ : 6·5, 11 : 180°·5 : 11″·9.

Σ 273. $11^h\ 27^m{\cdot}6$, N. 18° 2′ : 7·7, 8·7 : 358°·3 : 6″·9.

30 (Σ I 5). $11^h\ 32^m{\cdot}3$, N. 24° 19′ : 6·1, 7·1 : De., 273°·3 : 38″·6 : w., y. or azure. Y., blsh. grey, ’50 : y., pale lilac, ’56. Main both w., equal ’63 : De., 5·4, 6·6 : Sa. not 1 m^g. diff., ’74 : Fr. not more than 0·5 m^g. ’76.

33 (Σ 289). $11^h\ 36^m{\cdot}0$, N. 26° 44′ : 5·8, 8·7 : 359°·4 : 28″·5 : y., o. W., blsh., 8·7 very small, ’50. 27′ *s* is OΣ 43 : 7·2, 8·8 : 93° : 0″·5.

Σ 291. $11^h\ 36^m{\cdot}6$, N. 18° 27′ : 7·4, 7·7 : 119° : 3″·3.

μ (β 522). $11^h\ 37^m{\cdot}8$, N. 19° 40′ : 6, 12·5 : 263°·9 : 19″·4.

β 306. $11^h\ 39^m{\cdot}2$, N. 25° 18′ : 6·4, 11 : Doo., 20°·1 : 3″·2.

Σ 305. $11^h\ 42^m{\cdot}9$, N. 19° 2′ : 7·3, 8·2 : 330°·9 : 1″·6 : y. Motherwell : 314°·8 : 3″·2 : ’08.

41 (OΣ 47 rej.). $11^h\ 43^m{\cdot}2$, N. 26° 56′ : 4·1, 11·2, 11 : 261°·6, 203° : 20″·8, 34″·4.

π (Σ 311). $11^h\ 44^m{\cdot}8$, N. 17° 8′ : 4·9, 8·4, 10·2 : 119°·3, 110°·1 : 3″·3, 25″·2. H., 10·2 brighter than 8·4, 1782. Neither seen ’55 ; 9·5, 13, 9-in. ’71. So Sa., ’74. De., 5·5, 8·2, 11. Fr., 10·2 more like 13 or 14, ’76.

ε (Σ 333). II^{h} 54^{m}·6, N. 21° 2′ : 5·7, 6 : 188°·9 : 0″·5 : '30. Greenwich, '02 : 203° : 1″·2. Buffham, divided 4½-in. 'With' '69.
Σ 338. II^{h} 57^{m}·5, N. 10° 33′ : 8·2, 8·5 : 200°·3 : 20″·1.
Σ 342. III^{h} 0^{m}·2, N. 27° 37′ : 8·3, 8·8 : 306°·6 : 3″·1.
52 (Σ 346). III^{h} 0^{m}·7, N. 24° 57′ : 6, 6, 10·8 : 264°·5, 357°·2 : 0″·7, 5″·2. 6·5 notched, 450, 5½-in., '61.
Σ 376. III^{h} 15^{m}·7, N. 19° 27′ : 7·9, 8 : 351°·2 : 6″·8.
66 (β 878). III^{h} 23^{m}·8, N. 22° 32′ : 6, 12·2 : 78° : 1″·1.

STARS WITH REMARKABLE SPECTRA, AND VARIABLES.

S (var.). II^{h} 0^{m}·3, N. 12° 9′ : 9·1 < 16 : 292^{d}·2 : Peters.
V (var.). II^{h} 10^{m}·7, N. 11° 53′ : 8·9 : IV. Fleming.
R (var.). II^{h} 11^{m}·6, N. 24° 41′ : 7·5–13·7 : 186^{d}·7 : Ar.
T (var.). II^{h} 43^{m}·9, N. 17° 10′ : 7·9–10·1 : 313^{d} : Auwers.
ρ. II^{h} 51^{m}·3, N. 18° 1′ : 6 : III : Vogel.
U (var.). III^{h} 6^{m}·6, N. 14° 29′ : 7–13 : 370^{d} : Schaeberle.

AURIGA.

The leader of this beautiful constellation, Capella (V^{h} 10^{m}·7, N. 45° 56′), is very brilliant. h. and Σ think it has increased. h. classed it decidedly above Wega in 1847, otherwise than he had formerly, and, therefore, second in the heavens. So Galle and Heis; with me, Wega takes precedence; but the objects are distant, and differ in colour, w. and sapphire, and, as Sm. observes, this difference may influence estimates of size. Ptolemy, El Fergani (10th cent.), and Riccioli, have all called Capella *red*. Its parallax, as deduced by OΣ, shows amazing distance, far exceeding that of some smaller stars, and requiring nearly 11 y. for the transmission of its light to us. Peters, however, prefers 70 y. Spect. Bin. Barnard, *comes*: 16: 22°·6: 46″·6; several others more distant and brighter.

Double Stars.

Σ 572. IV^h 33^m·5, N. 26° 47′: 6·5, 6·5 (vars.): 210°·3: 3″·2: ysh.: '30. Bowyer '03: 201°·3.

Σ 577. IV^h 36^m·8, N. 37° 22′: 7·7, 7·7: 278°·7: 1″·6. Ph., '14: 59°·8: 1″·4.

Σ 603. IV^h 48^m·1, N. 49° 27′: 8, 8·2: 238°·6: 8″·4.

Σ 613. IV^h 53^m·8, N. 44° 1′: 7·7, 8·7, 11·7: 106°·6, 18°·8: 19″·8, 15″·8. β, '03: 104°·3, 16°·2: 16″·4, 15″·8.

ω (Σ 616). IV^h 53^m·8, N. 37° 47′: 4, 7·9: 351°·9: 6″·5: grnsh., blsh. w. W., ruddy, '50: an unusual combination, plainer with 80 than 250; so Fr., '77. c.p.m.

5 (OΣ 92). IV^h 54^m·8, N. 39° 17′: 6, 9·7: 230°·1: 2″·8: ysh. Lewis, '03: 253°.

Σ 619. IV^h 55^m·1, N. 50° 9′: 8·7, 8·7: 106°: 5″·4. A., '97: 121°·2: 4″·5.

Σ 623. IV^h 54^m·9, N. 27° 13′: 6·8, 8·3: 205°·1: 20″·4. Fr., w., bl.

Σ 621. IV^h 56^m·1, N. 39° 5′: 9, 9: 131^c·4: 9″·8.

9 (β 1046). IV^h 59^m·7, N. 51° 30′: 5·5, 12·7: 93°·8: 6″·3.

Σ 645. V^h 4^m·7, N. 27° 56′: 6·2, 8·2: 26°·8: 11″·7: w., ash. β, *comes* double: 8·7, 9·2: 75°·3: 0″·4.

Σ 644. V^h 4^m·9, N. 37° 12′: 6·7, 7: 219°·2: 1″·6: gold, blsh. red; remarkable and constant cols. De., gr., r.

Σ 648. V^h 5^m·9, N. 31° 56′: 7·4, 8·1: 74°·3: 4″·7: ysh., blsh.

14 (Σ 653). V^h 10^m·1, N. 32° 36′: 5, 11, 7·2: 342°·4, 225°·5: 12″·6, 14″·6: grnsh., o., blsh. w. Pale y., lilac, '50. So Fr., '77. 11, pretty steady, 9½-in.

spec.; glimpsed by Miss Mitchell, 5-in. achr., '61. OΣ, '95 : 351° : 11″·4.

Σ 666. v^h 11^m·8, N. 33° 15′ : 8, 8 : 71°·3 : 3″.

Σ 657. v^h 12^m·4, N. 52° 44′ : 7·5, 8 : 273°·9 : 1″·4. Doo., '97 : 283°·1.

16 (OΣ 103). v^h 12^m·9, N. 33° 17′ : 5·2, 11 : 56°·6 : 4″·5 : y., o. c.p.m. Wa., glimpsed $4\frac{3}{10}$-in. achr. Es., seen 5-in. Es., pair 12 sec. *f*, 10′ *n* : 7·5, 8·2 : 8°·4 : 13″·3, *comes* : 170°·5 : 78″ : double : 11·5, 11·5 : 355°·5 : 4″·6; another, 13·8 : 326°·7 : 13″.

Σ 669. v^h 13^m·1, N. 45° 10′ : 7·8, 8·3 : 275°·5 : 9″·7.

Σ 687. v^h 17^m·0, N. 33° 43′ : 8·2, 9, 9·2 : 67°·6, 153°·5 : 17″·2, 48″·7. Es., pale or., 2 bl. β, 9·2, double : 246°·9 : 0″·9. 27 sec. *f*, 23′ *s* is β 887 : 9, 10·5, 12 : 194°·3, 332°·8 : 1″, 10″·6, with two comites, 13·5 : 112°·8, 201°·6 : 9″·3, 14″·8. Lewis, pair (at 351°·6 : 38″·2), 12·5, 13·5 : 359°·5 : 2″·3.

σ (β 888). v^h 19^m·2, N. 37° 19′ : 6, 12 : 166°·3 : 8″·6. *Comes*, 14·2 : 330°·5 : 27″·2; another more distant.

Σ 698. v^h 19^m·9, N. 34° 47′ : 6·2, 7·7 : 346°·2 : 31″·1 : y., blsh. Beautiful.

Σ 699. v^h 20^m·2, N. 37° 58′ : 7·3, 8 : 342°·9 : 8″·8.

Σ 706. v^h 21^m·0, N. 30° 17′ : 8·2, 9·3 : 36°·8 : 3″·7. Lewis, '04 : 42°·7 : 4″·2.

Σ 718. v^h 26^m·2, N. 49° 20′ : 7·2, 7·2 : 74°·2 : 7″·8.

Σ 737. v^h 31^m·1, N. 34° 5′ : 8·2, 8·5 : 305° : 10″·7.

Σ 736. v^h 31^m·4, N. 41° 47′ : 7·2, 8·5 : 342°·4 : 2″ : w., blsh. β, '04 : 352°·2 : 2″·3.

26 (Σ 753). v^h 33^m·5, N. 30° 27′ : 5·8, 8·0 : 268°·0 : 12″·3 : y., blsh. Y., violet, '50. β doubles, 5·8 : 5·6, 6·0 : 334°·4 : 0″·15 : '92. Bowyer, '03 : 332°·5. Morton, *comes*; β, 11 : 112°·4 : 33″·2. Du., 4th, fainter.

Σ 764. v^h 36^m·2, N. 29° 30′ : 6·3, 6·8 : 13°·8 : 25″·9.

Σ 778. v^h 38^m·9, N. 30° 54′ : 7·7, 9 : 185° : 3″·2 : yw., o.

Ho. 19. v^h 42^m·6, N. 35° 8′ : 6·5, 12·5 : 342°·2 : 7″.

τ (*β* 192). v^h 43^m·6, N. 39° 9′ : 5, 12, 12 : 352°, 34° : 39″·3, 48″·5. Ellison, good test object.

Σ 791. v^h 44^m·5, N. 39° 33′ : 8·7, 9·3 : 90°·2 : 4″·9.

Σ 796. v^h 44^m·7, N. 31° 46′ : 6·9, 8 : 61°·2 : 3″·6 : w., bl. w.

Σ 799. v^h 46^m·7, N. 38° 33′ : 7·2, 8·3 : 192°·5 : 1″·1. Bowyer, ’03 : 184°·1.

Σ 802. v^h 46^m·9, N. 40° 8′ : 7·9, 8·5 : 108°·7 : 3″·2.

Σ 805. v^h 46^m·7, N. 28° 25′ : 7·7, 8·4 : 48°·4 : 12″·1.

Σ 808. v^h 47^m·7, N. 29° 46′ : 8·5, 8·5 : 57°·4 : 16″. De., *comes*, 11·6 : 165°·7 : 2″·9.

β (Barnard). v^h 53^m·7, N. 44° 56′. A., 2·1, 14·0 : 181°·4 : 12″·6. Spect. Bin. 30′ *s* is a fine pair, H*h*., 209. Es., 7·1, 9·6 : 328°·0 : 32″·8 : or., bl. *β*, *comes* : 11·5 : 332°·9 : 1″·6. $2\frac{1}{2}^m$ *p*, *β*, 32′ *n* is an 8·5 m^g. R. An or., 8 m^g., 30 sec. *f* *β*, 2′ *n*.

θ (O*Σ* 545). v^h 54^m·3, N. 37° 13′ : 3, 7·5 : 5°·6 : 2″·1 : two minute *comites*. Lau., ’07 : 338°·7.

Σ 825. v^h 56^m·2, N. 36° 31′ : 7·8, 9 : 146°·2 : 8″·2.

Σ 834. v^h 59^m·5, N. 30° 15′ : 8, 8·8 : 307°·9 : 22″·9.

β 893. v^h 59^m·5, N. 37° 58′ : 6·2, 12·5 : 128° : 17″·6.

O*Σ* 129. vi^h 1^m·3, N. 29° 31′ : 6·3, 11·2 : 209°·5 : 9″·9.

Webb. vi^h 2^m·5, N. 43° 9′ : 7·5, 9·5 : w., grey. Es., 216°·1 : 43″·6 ; another pair, 1^m 49^s *f* : 6·8, 10·5 : 214°·8 : 15″·4.

41 (*Σ* 845). vi^h 5^m·5, N. 48° 44′ : 5·2, 6·4 : 353°·1 : 8″. *Comes* tawny, or violet, ’52. c.p.m.

Σ 861. vi^h 6^m·2, N. 30° 42′ : 8·2, 8·2 : 318°·2 : 1″·6 : Trip., 7·8 : 14°·7 : 67″·1. Fr., ’15 : 17°·9 : 64″·4.

Σ 872. vi^h 10^m·3, N. 36° 11′ : 6, 7 : 217°·4 : 11″ : w., ’28 ; pale y., pale lilac, ’72 ; so Fr., ’77. De., w., ’65.

Σ 883. VI^{h} 13^{m}·6, N. 39° 48′: 8·2, 8·7, 10·4: 263°·4, 257°·8: 3″·3, 28″·7.

Σ 884. VI^{h} 14^{m}·5, N. 47° 9′: 8·5, 8·5: 270°: 9″.

Σ 888. VI^{h} 14^{m}·9, N. 28° 28′: 7·5, 9·2: 246°·2: 2″·7: v. w., ash. *β*, 7·5, double: 146°·0: 0″·2. A., ’07: 171°·5: 0″·2.

Σ 896. VI^{h} 19^{m}·5, N. 51° 55′: 8·3, 8·7: 82°·3: 20″. Fr., ’16: 18″·7.

Σ 906. VI^{h} 23^{m}·3, N. 37° 26′: 8·3, 9·5: 335°·9: 6″·6.

Σ 918. VI^{h} 27^{m}·6, N. 52° 32′: 6·7, 7·7: 322°·4: 4″·4. Ph., ’14: 330°·4: 4″·7.

Σ 928. VI^{h} 29^{m}·2, N. 38° 37′: 7·4, 8: 134°·4: 3″·4: yw., w. Es., y., grnsh.

Σ 929. VI^{h} 29^{m}·9, N. 37° 47′: 7·1, 8·2: 24°·6: 6″: ysh., v. bl. Es., between Σ 928, Σ 929, a beautiful triangle, 6·5, ysh., 8·5, 9, v. bl. *np* is Es.-Birm., 192: 6·3: red. A little *f* which is Σ 940: 8, 10: 293°·2: 10″·1.

Σ 933. VI^{h} 31^{m}·2, N. 41° 12′: 8, 8·5: 74°·7: 25″·6.

Σ 941. VI^{h} 33^{m}·0, N. 41° 39′: 7, 8: 77°·6: 1″·9: blsh. w., purpsh. w.

Σ 945. VI^{h} 34^{m}·7, N. 41° 4′: 7·1, 8: 249°: 1″·1. Ph., ’14: 268°·6: 0″·7.

54 (OΣ 152). VI^{h} 34^{m}·5, N. 28° 20′: 6, 7·8: 40°·2: 0″·9: ysh., grn. c.p.m.

56 (OΣΣ 78). VI^{h} 41^{m}·0, N. 43° 40′: De., 5·5, 8·0: 21°·4: 48″·2. Y., lilac, ’51. Lau., ’07: 24°·5: 43″·8.

Σ 964. VI^{h} 44^{m}·5, N. 43° 51′: 8·3, 9: 195°·5: 1″·7.

Σ 979. VI^{h} 50^{m}·7, N. 46° 39′: 8, 8·8: 209°·7: 7″·4. Bird, 8·8 down to 9·5, v. bl. De., 8, 9.

Σ 994. VI^{h} 54^{m}·1, N. 37° 13′: 7·2, 7·5: 56°·8: 25″·6. Es., *comes* 12, 220°·9: 9″·1.

Σ 1012. VI^{h} 59^{m}·9, N. 28° 15′: 8·2, 8·7: 167°·4: 12″·7.

65 (β 901). VII^{h} 16^{m}·1, N. 36° 55′: 5·8, 12·3, 12·7: 7°·9, 26°·8: 10″·6, 36″.

Stars with Remarkable Spectra, and Variables.

Es.-Birm. 98. IV^{h} 44^{m}·0, N. 34° 52′: 8·8: R.: IV: Es.

Es.-Birm. 102. IV^{h} 47^{m}·1, N. 38° 22′: 8·8: R.: IV: Es.

Es.-Birm. 107. IV^{h} 54^{m}·9, N. 39° 32′: 6·8: R. B. III.

ε (var.). IV^{h} 56^{m}·2, N. 43° 42′: 3–4·5. Spec. Bin. of long period.

TX (var.). V^{h} 3^{m}·6, N. 38° 54′: 8·7: IV: Es.

R (var.). V^{h} 10^{m}·8, N. 53° 30′: 6·5–13·8: 458^{d}·6: at Bonn.

Es.-Birm. 123. V^{h} 12^{m}·9, N. 42° 43′: 9: YR: III: Du.

Es.-Birm. 125. V^{h} 13^{m}·8, N. 35° 43′: 8·9: R: IV.: Es.

Es.-Birm. 130. V^{h} 16^{m}·6, N. 32° 26′: 9·3: IV: var.? Es.

S (var.). V^{h} 21^{m}·8, N. 34° 5′: 9–11: IV.: Du.

Es.-Birm. 137. V^{h} 22^{m}·0, N. 29° 51′: 8: R.: III? Es.

T (Nova). V^{h} 26^{m}·8, N. 30° 23′: disc. by Anderson, Jan. '92. 4 mag. fell to 16 in April. In Aug. Corder found it had revived to 9 mag., and Es. found neb. spec. and Barnard with 36-in. saw it as a plan. neb. In 1903 neb. line had disappeared, and the spectrum was continuous.

U (var.). V^{h} 36^{m}·8, N. 31° 59′: 8–13·5: 475^{d}·5: Es.

Es.-Birm. 156. V^{h} 42^{m}·7, N. 44° 49′: 9·2: R.: IV? Es.

Es.-Birm. 158. V^{h} 43^{m}·0, N. 30° 36′: 8·5: R.: IV: D'A.

π. V^{h} 53^{m}·8, N. 45° 56′: 4·8: R.: III: Se.

Es.-Birm. 177. VI^{h} 12^{m}·7, N. 33° 15′: 9·1: R.: Es.

V (var.). VI^{h} 18^{m}·0, N. 47° 43′: 9–11·7: 352^{d}: IV: Es.

RT (var.). VI^{h} 23^{m}·4, N. 30° 33′: 5·0–5·6: 3^{d}·75. Astbury.

Es.-Birm. 192. VI^{h} 31^{m}·0, N. 38° 31′: 6·3: IV: Se.

CLUSTERS, NEBULÆ, AND GROUPS.

Fine field ϕ. v^h 13^m·5, N. 40° 2′, including λ 5 m^g. Wa.

1857 (H. VII 33). v^h 14^m·6, N. 39° 16′. Splendid region.

19. v^h 14^m·5, N. 33° 53′. Grand large field.

1907 (H. VII 39). v^h 22^m·7, N. 35° 15′ : D'A., very large cl. of minute stars arranged in curves. 11–13 m^g. Ellison ; 5 in., faint.

1912 (M. 38). v^h 23^m·3, N. 35° 46′. Noble cl. arranged as oblique cross : pair of larger stars in each arm ; brighter star in centre ; not brighter than pairs '71, '77. Larger stars dot it prettily with open doubles. Glorious neighbourhood.

1931 (H. I 261). v^h 26^m·1, N. 34° 11′. Haze surrounding 4 minute stars, 9⅓-in. spec., '73, '76. H., 3 only in 3 obs. D'A., 5 ; E. of Rosse, 6 ; oval with branches.

1960 (M. 36). v^h 31^m·0, N. 34° 5′. Beautiful assemblage of stars 8 to 14 m^g., very regularly arranged. 2° *f* ϕ.

2709 (M. 37). v^h 47^m·1, N. 32° 32′. Sm. calls this 'a magnificent object ;' the whole field being strewed, as it were, with sparkling gold-dust ; and the group is resolvable into about 500 stars, from 10 to 14 m^g., besides the outliers. Even in smaller instruments extremely beautiful, one of the finest of its class. Gaze at it well and long. K. notices a brighter star near centre, Burton : ruby : 10, Es. : 9·0 : pale red. All the stars in the mass must be nearly at the same distance from us, and consequently their real sizes must be different. The aspect of the Nubecula Major in the S. hemisphere convinced h. of this : it is ocular proof of the incontrovertible, though long discredited fact, that the apparent brightness of stars has very little connection with their distance from the Earth. E. of Rosse, wonderful loops and curved lines of stars, first remarked by D'A.

BOÖTES.

A fine constellation, of which the leader, Arcturus (xiv^h 12^m·1, N. 19° 38′), is placed next to Sirius and before Wega, by H. and h.; Seidel gives Wega precedence. Fletcher has rated it alternately above and below Capella. (The Harvard Photometric Results give the magnitudes of these bright stars as, Sirius — 1·43; Arcturus, 0·03; Capella, 0·18; Wega, 0·19.) A noble object at all times, but never so interesting as when enveloped in the tail of Donati's comet, 1858, Oct. 5, and only 20′ from the nucleus, it flashed out so vividly its superiority. Sm. calls it reddish yel.; it is golden yel. to me. Schm. thought it had of late years lost all redness and was growing paler. Spect. II type. The first star seen in daytime by Morin, 1635; it is stated, however, that Galileo saw stars by day. Schm. has seen it, *with the naked eye,* 24^m before sunset. Stone finds its heating power perceptible and considerably greater than that of Wega, which, however, can be detected. Huggins gives its heat equal to that of Regulus, and ½ greater than that of Sirius; Castor showing none. Arcturus has a great annual proper motion of more than 1″ R.A., and nearly 2″ Dec.: so that, as Humboldt says, it has moved 2½ times the Moon's diam. since the days of Hipparchus. Yet its parallax is almost insensible; so that, according to Peters, we wait for its light more than 25 yrs. How inconceivable, then, must be its dimensions and its speed! Besides this motion, Huggins finds with the spectroscope that it is approaching us at the rate of 55 miles per second! Boötes is rich in pairs, poor in clusters and nebulæ.

DOUBLE STARS.

β 612. xiii^h 35^m·6, N. 11° 9′: 6·4, 6·4: 56°·1: 0″·2: ’78. Bin. 23·05 yrs. Greatest separation, 0″·3; least, 0″·1. A., ’12: 183°·1: 0″·24. Angle increasing.

1 (Σ 1772). xiii^h 36^m·2, N. 20° 22′: 6·2, 9·1: 148°·7: 4″·8: blsh. w., v. bl. Bies., ’03: 141°·2. 7 m^s. blsh., and Fl. another bl., in field.

τ (OΣ 270). xiii^h 43^m·5, N. 17° 51′: 4·8, 11·4: 347°·8: 10″·3: grnsh. w., o. Doo., ’01: 355°·8: 8″·7. 11·4, var. ? Wa., $4\frac{3}{10}$-in. achr. Sa., easy, $6\frac{1}{2}$-in. spec., and fine lilac.

Σ 1785. xiii^h 45^m·5, N. 27° 23′: 7·2, 7·5: 164°·4: 3″·5: w. ’30. K., v. pale y., blsh., ’71, so Fr., ’76. Ph., ’13: 334°·0: 1″·3.

OΣΣ 126. xiii^h 47^m·6, N. 21° 39′: De., 6·3, 6·8: 208°·4: 85″·9: w., y. Some diff. in col. ’52; ysh., blsh. w. ?, but very little in m^s., each about 7; *f* the larger 9-in. ’72. Fr., slight diff., ’76. 6, fine y. 5 m^s in field.

Σ 1793. xiii^h 55^m·4, N. 26° 13′: 7, 8: 242°·3: 4″·4: w., blsh.

Σ 1794. xiii^h 56^m·0, N. 20° 17′: 8·5, 8·7: 129°·8: 2″: ysh.

Σ 1797. xiii^h 58^m·2, N. 19° 49′: 8·2, 8·5: 160°: 21″·1.

Σ 1804. xiv^h 4^m·5, N. 21° 34′: 8, 9: 18°·3: 4″·4: w., bl.

Σ 1808. xiv^h 6^m·5, N. 26° 59′: 8, 9: (74°·7): 2″·8.

Σ 1810. xiv^h 8^m·0, N. 28° 25′: 8·4, 9: 173°·8: 1″·8.

Σ 1814. xiv^h 8^m·1, N. 50° 38′: 8·5, 9: 256°·2: 11″.

Σ 1813. xiv^h 9^m·4, N. 5° 47′: 8, 8·1: 191°: 4″·8.

Σ 1816. xiv^h 10^m·4, N. 29° 29′: 7, 7·1: 80°·2: 1″·9: ysh.

Σ 1817. xiv^h 10^m·6, N. 27° 4′: 8, 8·6: 7°: 1″·6.

κ (Σ 1821). xiv^h 10^m·6, N. 52° 10′ : 5·1, 7·2 : 237°·7 : 12″·6 : grnsh., blsh. Pale y., blsh., '50. Fr., yw., purple, '15. Widening.

Σ 1826. xiv^h 12^m·2, N. 47° 21′ : 8·2, 9·2 : 315°·1 : 4″·4.

Σ 1829. xiv^h 12^m·6, N. 50° 49′ : 7·7, 8·2 : 150°·3 : 5″·3.

Σ 1825. xiv^h 12^m·8, N. 20° 30′ : 6·8, 8·5 : 185°·7 : 3″·4 : w., o. Fr., ruddy or dusky, '76. Hu., '02 : 172°·7 : 4″·1. *f* α, 1° *n*.

Σ 1828. xiv^h 13^m·3, N. 24° 34′ : 9·2, 9·2 : 160°·1 : 1″·9.

ι (Σ I 26). xiv^h 13^m·4, N. 51° 44′ : 4·9, 7·5 : De., 33°·2 : 38″·1 : y.w. Wy., lilac, '50. D., 7·5, purple, '48. Wa., minute *comes s*. c.p.m.

Σ 1834. xiv^h 17^m·4, N. 48° 52′ : 7·1, 7·2 : 113°·7 : 1″·4 : '31. Hu., '04 : single. Bryant, '08 : 358°·9 : 0″·13. A., '11 : 83°·8 : 0″·17. Bin. ?

Σ 1839. xiv^h 18^m·8, N. 54° 17′ : 8·3, 8·3 : 261°·9 : 14″·4.

Σ 1835. xiv^h 19^m·4, N. 8° 49′ : 5·5, 6·8 : 186°·5 : 6″·1 : grnsh. w., blsh. w. Fr., '16 : 191° : 6″·4 : w., lilac. W., pale y., sometimes bl., more usually tawny, '54 ; 9-in. '72 : an uncertainty of hue, which I have found troublesome in the smaller components of some pairs. β, *comes* double : 8·4, 8·4 : 315°·3 : 0″·2 : '89. A., '12 : 92°·6 : 0″·2. Rapid bin.

Σ 1838. xiv^h 20^m·3, N. 11° 36′ : 7·2, 7·3 : 333°·4 : 8″·9.

Σ 1843. xiv^h 21^m·7, N. 48° 12′ : 7·2, 8·7 : 188°·1 : 20″·1.

θ (Ward). xiv^h 22^m·5, N. 52° 13′ : 4, 12 : Es. 181°·9 : 68″·8.

Σ 1850. xiv^h 25^m·0, N. 28° 39′ : 6·1, 6·7 : 262°·2 : 25″·7 : v.w., '33. Pale y., pale bl., 9-in. spec. '72 ; so Fr., '76.

A 570. xiv^h 28^m·8, N. 27° 2′ : 6·3, 6·5 : 198°·6 : 0″·2. '03. Bowyer, '08 : 162°·4.

Σ 1855. xiv^h 29^m·0, N. 31° 59′ : 8·2, 9·1 : 248°·6 : 15″·3.

Σ 1858. xiv^h 30^m·3, N. 35° 56′ : 7·2, 8 : 35°·2 : 2″·2.

Σ 1861. xiv^h 32^m·9, N. 12° 31′ : 8·7, 9·2 : 175°·5 : 14″.

π (Σ 1864). xiv^h 37^m·0, N. 16° 46′ : 4·9, 6 : 99°·2 : 5″·8 : v.w. Bies., '03 : 103°·3. 6 a little tawny or ruddy, '50.

ζ (Σ 1865). xiv^h 37^m·5 : N. 14° 5′ : 3·5, 3·9 : 309°·1 : 1″·2 : w., '30. Ph., '14 : 141°·4 : 0″·7, widening. Pale y., '54. Bin. ?

Σ 1867. xiv^h 37^m·3, N. 31° 38′ : 7·7, 8·2 : 21°·8 : 1″·6. A., '04 : 13°·2 : 1″·1.

Σ 1871. xiv^h 38^m·8, N. 51° 44′ : 7, 7 : 283°·2 : 1″·8. Do., '03 : 294°·2.

Σ 1874. xiv^h 39^m·4, N. 49° 28′ : 7·7, 9·2 : 288°·4 : 25″·7. Fr., '15 : 26″·7.

Σ 1875. xiv^h 40^m·4, N. 38° 5′ : 8·7, 9·2 : 310°·7 : 3″·2.

Σ 1873. xiv^h 40^m·9, N. 8° 3′ : 7·8, 8·3 : 94°·4 : 6″·3 : v.w. Ysh., blsh., '71.

ε (Σ 1877). xiv^h 41^m·5, N. 27° 21′ : 3, 6·3 : 321°·0 : 2″·6 : v. y., v. bl. Bies., '03 : 330°·3. Light y., grnsh., '50. Se., most beautiful y., superb bl. A well-known test for moderate telescopes. Buffham has split it with $1\frac{7}{8}$-in. of 9-in. 'With' spec. I have seen it perfectly with $2\frac{1}{4}$-in. achr.

OΣ 285. xiv^h 42^m·5, N. 42° 43′ : 7·1, 7·6 : 72°·2 : 0″·6, '45. A., '11 : 103° : 0″·4. Bin.

Σ 1883. xiv^h 44^m·9, N. 6° 17′ : 7, 7 : 272° : 1″·2 : ysh., '30. Bryant, '11 : 231°·8 : 0″·4.

Σ 1884. xiv^h 44^m·8, N. 24° 42′ : 6·2, 7·8 : 52°·2 : 1″·2 : ysh., blsh., '29. D., w., brownish, '48. c.p.m.

39 (Σ 1890). xiv^h 47^m·0, N. 49° 3′ : 5·8, 6·5 : 44°·1 : 3″·7 : w., certainly purplish. Both w., '50. So De.

Σ 1889 rej. xiv^h 47^m·1, N. 51° 42′ : β, 6·5, 9·8 : 87°·6 : 15″·6.

Σ 1886. xiv^h 47^m·2, N. 10° 3′ : 7·2, 9·2 : 228°·2 : 7″·5.

ξ (Σ 1888). xiv^h 47^m·7, N. 19° 26′ : 4·7, 6·6 : 334°·2 : 7″·2 : y., purplsh. red. Ph., '14 : 110°·2 : 2″·2. Clear y., rsh., purp., '50. De., y., r., '63 to '77. Bin. 175 years ? ; β 31, 31′ *sf* : 8·5, 10·2, 12·5 : 188°·1, 162°·7 : 1″·3, 9″·0 : '78. Bin. A., '05 : 196°·9.

OΣ 288. xiv^h 49^m·6, N. 16° 2′ : 6·4, 7·1 : 230°·3 : 0″·7. Bowyer, '11 : 186°·4 : 1″·4. r.m.

OΣ 289. xiv^h 52^m·7, N. 32° 37′ : 6·3, 9·8 : 120°·2 : 4″·9.

Σ 1895. xiv^h 54^m·4, N. 40° 30′ : 7·8, 8·3 : 43°·4 : 12″·4.

44 (Σ 1909). xv^h 1^m·2, N. 47° 58′ : 5·2, 6·2 : 234°·1 : 2″·9 : ysh., blsh. '32. Y., ruddy, or purpsh., '50. Great diff. as to cols. Σ and Ar. var. Lewis, '11 : 247°·6 : 4″·1. Bin. now closing. Lewis, pair 1^m *p*, 5′ *s* : 7, 12·5 : 64°·8 : 12″·4.

Σ 1907. xv^h 1^m·7, N. 11° 57′ : 8·5, 9·7 : 11°·8 : 1″·1.

Σ 1908. xv^h 1^m·7, N. 34° 47′ : 8·2, 9·2 : 137°·2 : 1″·3. Bowyer, '11 : 146°·9.

47 (β 1086). xv^h 2^m·8, N. 48° 28′ : 5½, 13·2 : 254°·1 : 6″·3.

Σ 1910. xv^h 3^m·7, N. 9° 32′ : 7, 7 : 209°·2 : 4″ : y.w. Fr., '15 : 212°·7 : 4″·4.

Σ 1916. xv^h 6^m·9, N. 39° 17′ : 7, 9·5 : 329°·6 : 10″.

Σ 1920. xv^h 8^m·2, N. 47° 9′ : 8·5, 8·5 : 291°·1 : 19″ : y.w.

Σ 1917. xv^h 8^m·8, N. 15° 41′ : 9·3 : 239°·3 : 2″·2.

Σ 1919. xv^h 9^m·2, N. 19° 34′ : 6·1, 7 : 10°·2 : 24″·8 : y.w., w. Pale y., pale bl., '83. c.p.m.

Σ 1921. xv^h 9^m·4, N. 38° 58′ : 7, 7·2 : 283°·7 : 30″·3.

Σ 1923. xv^h 10^m·2, N. 14° 45′ : 8·5, 9·2 : 12°·5 : 4″·8 : y., o.

Σ 1926. xv^h 11^m·9, N. 38° 35′ : 6·1, 8·4 : 260°·6 : 1″·6 : ysh., bl. Lewis, '11 : 255°·9 : 1″.

δ (Σ I 27). xv^h 12^m·3, N. 33° 35′ : 3·2, 7·4 : De., 78°·8 : 105″·1. Bright y., fine bl., '50. B., among pairs and triplets. c.p.m.

Σ 1934. xv^{h} 14^{m}·6, N. 44° 5′: 8·5, 8·5: 45°·1: 5″·3. Lewis, ’06: 27°·7: 7″·3. r.m.

μ^1 (Σ I 28). xv^{h} 21^{m}·5, N. 37° 39′: 4, 6·5: 171°·9: 108″·5. 6·5, μ^2 (Σ 1938): 6·7, 7·3: 327°·0: 1″·4: grnsh.w. Lewis, ’11: 57°·7: 1″·2. Bin. Angle decreasing. All one vast system.

ν^2 (A 1634). xv^{h} 28^{m}·9, N. 41° 10′: 5·5, 5·5: 237°: 0″·1. Forms with ν^1 a fine wide pair.

OΣ 298. xv^{h} 33^{m}·2, N. 40° 4′: 7·0, 7·3: 181°·6: 1″·2: ’46. Bin. 56·6 yrs. with p.m. 0″·5, in which 7 m^{s}. *n* shares. Angle increasing and distance now diminishing. 30′ *sp* ϕ.

STARS WITH REMARKABLE SPECTRA, AND VARIABLES.

T (Nova ?). xiv^{h} 10^{m}·4, N. 19° 26′: one appearance: 9·7. Baxendell.

S (var.). xiv^{h} 20^{m}·2, N. 54° 10′: 8–13·5: 270^{d}. Bonn.

X (var.). xiv^{h} 20^{m}·4, N. 16° 41′: 9–10·2: 121^{d}·5. Baxendell.

Es.-Birm. 401. xiv^{h} 20^{m}·6, N. 21° 50′: 8·2: pale r.: Lindemann. III. Es.

Es.-Birm. 402. xiv^{h} 20^{m}·6, N. 26° 5′: 8·0: h. D’A., III. Es., var.

V (var.). xiv^{h} 26^{m}·5, N. 39° 13′: 6·9–11: 256^{d}: Du.

R (var.). xiv^{h} 33^{m}·7, N. 27° 5′: 6·6–12·9: 223^{d}·3: Bonn.

Es.-Birm. 411. xiv^{h} 35^{m}·9, N. 32° 53′: 8·2: R.: III: Es.

Es.-Birm. 414. xiv^{h} 37^{m}·9, N. 31° 54′: 8: R.: III: var. Es.

Es.-Birm. 416. xiv^{h} 42^{m}·4, N. 15° 26′: 5·5: III: D’A.

U (var.). xiv^{h} 50^{m}·6, N. 18° 1′: 9·1–13·6: 177^{d}·5: Baxendell.

CLUSTER AND NEBULA.

5466 (H. VI 9). xiv^{h} 2^{m}·3, N. 28° 54′. Faint white cloud. 5′ to 6′ in diam. h. stars 11 m^{s}.

5820 (H. II 756). XIV^{h} 56^{m}·3, N. 54° 12′. Faint: guide to 7·5 m^{g}. pair *f*, from which a straight line of small stars extends.

CAMELOPARDUS.

Wide spread, but obscure; containing many good objects.

DOUBLE STARS.

Σ 349. III^{h} 4^{m}·0, N. 63° 29′: 7·4, 8·1: 319°·8: 6″·1.

Σ 362. III^{h} 9^{m}·8, N. 59° 44′: 7·7, 8: 142°·3: 6″·9. De., quintuple. In beautiful wide group.

O*Σ* 52. III^{h} 10^{m}·5, N. 65° 22′: 6·4, 7·0: 151°·4: 0″·5. Storey, '10: 116°·8.

Σ 368. III^{h} 14^{m}·4, N. 68° 10′: 8·5, 8·5: 342°·1: 2″·3.

Σ 374. III^{h} 16^{m}·8, N. 67° 10′: 7, 8·5: 294°·7: 10″·8: w., ash.

Σ 386. III^{h} 21^{m}·9, N. 54° 54′: 8·8, 8·8: 58°·8: 2″·5.

Σ 385. III^{h} 22^{m}·5, N. 59° 40′: 4·7, 9: 161°·4: 2″·4: y., o. 2′ *s*, 34^{s} *p*, *Σ* 384: 7·8, 9: 267°·5: 2″: gold, blue. 42^{s} *f*, 1′ *s*, *Σ* 385, Holmes, pair, Es., 9, 10·5: 51°·2: 5″·1; 1^{m} 9^{s} *f* this are two 9·5 stars. The *n* one has a faint *comes* at 4″, the *s* at 5″. 1^{m} 11^{s} *f*, 36′ *s* of *Σ* 385, is *Σ* 389: 7, 8: (66°·5): 2″·8: w., purp.

Σ 390. III^{h} 23^{m}·8, N. 55° 11′: 4·8, 9·2: 159°·6: 15″: grnsh. w., o. Fr., ysh. w., blsh. Pale ruby, 7·5, *sf*.

O*Σ* 54. III^{h} 24^{m}·5, N. 67° 19′: 7·2, 8·5: 354°·6: 25″·9. De., clear yellow, olive.

Σ 396. III^{h} 27^{m}·1, N. 58° 30′: 6·3, 8: 241°·8: 20″·4. Fr., w., bl.

Σ 400. III^{h} 28^{m}·4, N. 59° 46′ : 7, 8 : 282°·6 : 1″·5 : yw., blsh. w. A., '12 : 2°·6 : 0″·4.

OΣΣ 37. III^{h} 32^{m}·8, N. 44° 33′ : De., 6·2, 6·5 : 95° : 41″·2 : w. Es., ysh., blsh. β, *comes* : 37°·7 : 29″·4.

OΣΣ 36. III^{h} 32^{m}·9, N. 63° 47′ : De., 6·3, 7·3 : 70°·2 : 45″·8 : w., y. Es., pale y., pale or.

P. III 97. III^{h} 36^{m}·1, N. 59° 43′ : 6, 9 : K., 34°·3 : 55″·6. Orange with scarlet glare, bl. Es., two *comites* : 13, 12·6 : 94°·9, 300° : 21″·4, 34″·9.

OΣΣ 39. III^{h} 42^{m}·9, N. 56° 53′ : De., 5·9, 6·6 : 74°·8 : 58″·6. Es., blsh., ysh.

Σ 445. III^{h} 43^{m}·9, N. 59° 53′ : 8·2, 9·2 : 253°·2 : 3″.

Σ 455. III^{h} 49^{m}·0, N. 69° 17′ : 8·2, 8·7 : 167°·4 : 11″·9.

OΣ 67. III^{h} 50^{m}·3, N. 60° 53′ : 5, 8·2 : 43° : 1″·7 : gold, grn.

Σ 480. III^{h} 58^{m}·1, N. 55° 29′ : 8·3, 8·5 : 324° : 3″·2.

Σ 485. IV^{h} 0^{m}·8, N. 62° 4′ : 6·1, 6·2 : 303°·3 : 18″. Es., *comes*. (β., 256°·6 : 6″·7 : 13·1.) 4 other *comites* at 11″, 14″, 14″·4, 19″. In field is Σ 484 : 9, 9·5, 9 : 132°·4, 324°·3 : 5″·4, 22″·6, with another, 9·3 at 48″·8.

Σ 474. IV^{h} 2^{m}·1, N. 76° 2′ : 8·5, 8·5 : 145°·4 : 22″·6.

Σ 490. IV^{h} 3^{m}·6, N. 59° 57′ : 8·5, 9 : 55°·7 : 4″·6.

Σ 503. IV^{h} 9^{m}·7, N. 63° 58′ : 8·8, 8·8 : 226°·7 : 4″·3.

Σ 522. IV^{h} 16^{m}·3, N. 51° 25′ : 8·5, 8·5 : 37°·8 : 1″·5.

Σ 526. IV^{h} 18^{m}·2, N. 60° 5′ : 8·2, 8·7 : 52°·2 : 5″·7.

1 (Σ 550). IV^{h} 25^{m}·7, N. 53° 45′ : 5·1, 6·2 : 307°·1 : 10″·1 : w., blsh. w. Ysh., doubtful, perhaps grn., sometimes tawny, '52. D., sapph. De., grn., or bl., pale rose '54. Fr., ysh. w., purple, '15. c.p.m.

Σ 553. IV^{h} 27^{m}·1, N. 50° 53′ : 8, 8·5 : 133°·3 : 3″·1.

Σ 557. IV^{h} 30^{m}·2, N. 62° 49′ : 8, 8·7 : 126°·1 : 23″·4. Hu., doubles 8·7 : 0″·2.

2 (Σ 566). IV^{h} 33^{m}·6, N. 53° 19′ : 5·1, 7·4 : 311°·4 : 1″·6 : y., blsh. β, 288°·7 : '01 ; who doubles 5·1, 7 : 140°·4 : 0″·2, with *comes*, 13·2 : 212°·8 : 23″·3. De., pair in field : 8·5, 9·5 : 264°·2 : 5″·7. Es., *comes*, 12·5 : 67°·7 : 18″.

3 (β 1043). IV^{h} 33^{m}·6, N. 52° 55′ : 5, 12 : 295°·7 : 3″·7.

Σ 587. IV^{h} 41^{m}·7, N. 52° 59′ : 7, 8·5 : 185° : 20″·9.

5 (β 1187). IV^{h} 48^{m}·5, N. 55° 8′ : 5·5, 12·8 : 245°·2 : 12″·9.

OΣ 88. IV^{h} 50^{m}·0, N. 61° 38′ : 6·5, 8·2 : 302°·4 : 0″·7.

7 (Σ 610). IV^{h} 50^{m}·9, N. 53° 38′ : 4·2, 11·3 : 238°·3 : 25″·6. β easy 6-in., and Wa. $4\frac{3}{10}$. De. divided 4·2, 7·9 : 308°·8 : 1″·2. (A., 294°·4 : 0″·9 : '04), olive. He had never seen so sombre a star.

Σ 604. IV^{h} 51^{m}·1, N. 69° 56′ : 8·1, 8·9 : 39°·9 : 2″·2.

Σ 618. IV^{h} 56^{m}·0, N. 62° 58′ : 7, 7·3 : 211°·5 : 32″·2. c.p.m. *s* is Σ 617 : 8·5, 8·7 : 120°·6 : 12″·4.

β (OΣΣ 57). IV^{h} 56^{m}·3, N. 60° 20′ : De., 4, 7·2 : 208°·2 : 80″·3 : y., w. ? Fr., lucid y., fine bl. Es., *comes* to 7·2, 11·5 : 167°·5 : 14″·8.

11, 12 (Σ I 13). IV^{h} 58^{m}·2 N. 58° 52′ : 5, 6 : 8° : 180″·3 : blsh., v.y., or red. Ysh., pale red. Fine field.

Hu. 1097. V^{h} 1^{m}·7, N. 76° 22′ : 6·5, 11 : 113°·3 : 1″·5.

Σ 638. V^{h} 5^{m}·5, N. 69° 44′ : 7·5, 8·5 : 222°·4 : 5″·3 : ysh., v. bl.

Σ 634. V^{h} 9^{m}·3, N. 79° 9′ : 4·5, 7·9 : 348°·6 : 34″ : ysh., w. Y., violet ? '52. β '04 : 21°·6 : 12″·3 from p.m. of 4·5.

Σ 677. V^{h} 16^{m}·2, N. 63° 19′ : 7·7, 8 : 279°·4 : 1″·7. Storey, '10 : 240°·6 : 1″·3. Bin.

Σ 695. V^{h} 28^{m}·9, N. 79° 17′ : 8·3, 9 : 155°·8 : 10″·3. *Comes* to 9, 9·7 : 972°·5 : 1″·9.

Hu. 1107. V^{h} 29^{m}·5, N. 64° 6′ : 6·5, 10·5 : 48°·8 : 1″·3.

Σ 3115. V^{h} 40^{m}·7, N. 62° 47′ : 6·7, 7·8 : 35°·6 : 1″·7 : w., ashy w. Storey, ’11 : 17°·6 : 1″·3.

Σ 780. V^{h} 43^{m}·0, N. 65° 44′ : 6·7, 7·9, 10·2 : 103°·6, 154°·9 : 3″·8, 10″·9 : y., bl., o. β, *comes* 13·5 : 53°·1 : 18″.

35 (OΣ 128 rej.). V^{h} 58^{m}·1, N. 51° 35′ : De., 6·3, 8·7 : 13°·1 : 39″·4 : w., azure. Yw., blsh., or purpsh., ’52. Hu. doubles 8·7 : 339°·5 : 0″·5.

Σ 784. V^{h} 59^{m}·2, N. 84° 12′ : 8·7, 8·7 : 187°·7 : 1″·3 : yw. Storey, ’10 : 196°·6.

Σ 831. VI^{h} 2^{m}·6, N. 68° 0′ : 8·7, 8·7 : 74°·1 : 11″·8.

Σ 868. VI^{h} 13^{m}·2, N. 73° 58′ : 8·5, 9 : 41°·8 : 3″·3.

OΣ 136. VI^{h} 19^{m}·1, N. 70° 35′ : 6·5, 10·3 : 79°·6 : 5″·7.

Σ 973. VI^{h} 53^{m}·5, N. 75° 21′ : 6·6, 7·6 : 26°·7 : 11″·9 ; w. Fr., ’15 : yw., lilac.

Σ 1006. VI^{h} 59^{m}·5, N. 62° 40′ : 7, 8 : 71°·6 : 30″·6 : yw. Fr., ’15 : 29″·7.

47 (Σ 1055). VII^{h} 15^{m}·3, N. 60° 3′ : 6, 10·5 : 344°·1 : 2″·4 : Storey, ’11 : 328°·6 : 2″·1.

Σ 1051. VII^{h} 17^{m}·0, N. 73° 14′ : 6·5, 8·6 : 268°·5 : 1″·2. A., ’08 : 282°. A 6·7 : 81°·6 : 31″·2.

Σ 1122. VII^{h} 36^{m}·4, N. 65° 22′ : 7·1, 7·1 : 4°·9 : 15″·5 : w. Fr., ’77, decidedly ysh., ’15, 6·8, 7·6.

Σ 1127. VII^{h} 39^{m}·6, N. 64° 16′ : 6·2, 8, 9·2 : 340°·4, 174°·9 : 5″·2, 11″·3 : v.w., ashy, o.

OΣΣ 90. VII^{h} 55^{m}·4, N. 63° 19′ : De., 6, 7 : 81°·8 : 47″·4 : v.w., y. Fr., ’14 : 49″·7.

Σ 1169. VIII^{h} 4^{m}·3, N. 79° 45′ : 7·6, 7·9 : 10° : 20″·7.

Σ 1193. VIII^{h} 12^{m}·3, N. 72° 37′ : 6, 9 : 85°·2 : 44″ : v.y., o. Fr., ’16 : 85°·7 : 43″·5 : y., bl.

OΣ 192. VIII^{h} 27^{m}·5, N. 75° 0′ : 6·5, 10 : 237°·7 : 1″·6.

Σ 1471. X^{h} 46^{m}·5, N. 80° 14′ : 9, 9·1 : 3°·6 : 2″·1.

Σ 1479. x^{h} 54^{m}·2, N. 83° 40′ : 8, 9 : 21°·6 : 4″·6 : yw., ashy w.

Σ 1539. xi^{h} 24^{m}·6, N. 81° 29′ : 8, 9·2 : 313°·1 : 19″.

OΣΣ 117. xii^{h} 7^{m}·6, N. 82° 9′ : De., 6, 8 : 75°·6 : 65″·1 : gold, azure. Fr., '14 : 66″·7.

Σ 1625. xii^{h} 12^{m}·8, N. 80° 34′ : 6·5, 7 : 218°·8 : 14″·3.

Σ 1694. xii^{h} 48^{m}·5, N. 83° 51′ : 4·9, 5·4 : 327°·2 : 21″·8. v.w. Some diff., '52, $3\frac{7}{10}$-in. : pale y., pale violet; not quite a match, '63, $5\frac{1}{2}$ in. Main, equal '62. De., 4·5, 5·0 : '66. Fr., pale y., pale lilac : '77. Sm., *comes* 11, *sp*.

Σ 1720. xii^{h} 58^{m}·9, N. 83° 35′ : 8·4, 8·7 : 334°·6 : 1″·6.

STARS WITH REMARKABLE SPECTRA, AND VARIABLES.

Es.-Birm. 63. iii^{h} 3^{m}·3, N. 65° 26′ : 9·0 : R. : III ? Es.

Star. iii^{h} 12^{m}·9, N. 65° 12′ : 4·5. Hy. : Es.

U (var.). iii^{h} 34^{m}·9, N. 62° 23′ : 6·6–7·8 : IV : Har.

Es.-Birm. 81. iii^{h} 58^{m}·9, N. 61° 35′ : 7·5 : R. : IV : Es.

T (var.). iv^{h} 32^{m}·4, N. 66° 2′ : 7–13·5 : 370^{d} : IV. pec. : Es.

Es.-Birm. 97. iv^{h} 42^{m}·9, N. 68° 2′ : 7 : R. : Arg. IV : Se. Var. Backhouse.

11. iv^{h} 59^{m}·2, N. 58° 52′ : 5·3 : Hy. Har.

S (var.). v^{h} 32^{m}·4, N. 68° 46′ : 8–10 : 328^{d} : Es.

Es.-Birm. 274. viii^{h} 40^{m}·2, N. 78° 28′ : 6·5 : yr. : III : De.

R (var.). xiv^{h} 23^{m}·4, N. 84° 12′ : 7·9–13·7 : 269^{d}·5 : Hencke.

NEBULÆ.

App. I 356. iii^{h} 59^{m}·5, N. 69° 36′ : neb., pretty br. and large. Denning.

1501 (H. IV 53). iv^{h} 0^{m}·1, N. 60° 41′ : Plan. : small and dim. E. of Rosse sees a bright ring, with 14 m^{g}. in central darkness. Gas.

2655 (H. I 288). VIII^{h} 44^{m}·3, N. 78° 31′ : nucleus like 11 m^{g}. star.

CANCER.

A constellation marked only to the naked eye by the remarkable cluster Præsepe.

DOUBLE STARS.

Σ 1170. VII^{h} 55^{m}·3, N. 13° 56′ : 8·3, 8·3 : 95°·7 : 2″·2.

Σ 1171. VII^{h} 55^{m}·9, N. 23° 49′ : 6·2, 10·7 : 338°·6 : 2″·8 : y., o. Do., '03 : 329°·1.

O*Σ* 186. VII^{h} 58^{m}·4, N. 26° 29′ : 7·5, 8·2 : 74°·1 : 0″·8.

6. VII^{h} 58^{m}·6, N. 28° 1′. B., triple. Es., 5, 12, 11 : 187°·5, 81° : 60″·1, 78″·6.

Σ 1179. VIII^{h} 0^{m}·3, N. 12° 18′ : 8·5, 8·5 : 205°·2 : 17″·9. Lewis, '04 : 20″·3. *β*, *comes* double : 11·5 : 57°·6 : 3″·9.

Σ 1177. VIII^{h} 0^{m}·7, N. 27° 45′ : 6·5, 7·4 : 354°·7 : 3″·5 : v.w., ashy w. D., pale grn., pale y. De., w., azure.

Σ 1188. VIII^{h} 4^{m}·6, N. 30° 35′ : 8, 8·7 : 201°·3 : 15″·9. Fr., '16 : 16″·4.

Σ 1191. VIII^{h} 6^{m}·2, N. 19° 16′ : 8·7, 9·2 : 70°·9 : 3″·2.

ζ (*Σ* 1196). VIII^{h} 7^{m}·6, N. 17° 54′ : 5·0, 5·7 : y. Bin. P., 60 yrs. Dist. 0″·5 (1870) to 1″·1 (1900), will close, with decreasing P. till 1930. (Ph., '15 : 308°·6 : 1″.) Triple : 5·5 : 154°·7 : 5″·3, '26. Ph., '15 : 112°·7 : 4″·8, with irregularities which have been perplexing. *β*, comparing its place with a neighbouring star, shows that in 14 years there are no irregularities, and that the motion so far is rectilinear. Excellent test, close pair, well separated 8-in. 'With' spec. 300, when 0″·5; one disc. apart, $9\frac{1}{3}$-in., spec., '78 when 0″·7; very easy '85 at 1″.

Σ 1197. VIII^h 7^m·8, N. 29° 47′: 8·2, 9: 102°·6: 1″·6.

Σ 1206. VIII^h 10^m·4, N. 7° 25′: 9, 9·5: 199°: 13″·2.

Σ 1219. VIII^h 18^m·7, N. 7° 54′: 8·5, 8·5: 260°: 11″·6.

ϕ^2 (Σ 1223). VIII^h 22^m·0, N. 27° 12′: 6, 6·5: 212°: 4″·6. Much less unequal, '49; nearly equal, '59; so Talmage, '65: Fr., '77. Du., ± 0·1, '71, '74; $\frac{1}{4}$ or $\frac{1}{3}$ m^g. diff., '72. De., 6·0, 6·3.

υ^1 (Σ 1224). VIII^h 21^m·9, N. 24° 48′: 6, 7·1: 37°·3: 5″·8. Bies., '03: 44°. A. divides *comes*: 8·0, 8·1: 140°·7: 0″·2.

Σ 1228. VIII^h 22^m·8, N. 27° 49′: 8, 8·5: 352°: 8″·9.

Σ 1231. VIII^h 24^m·9, N. 31° 38′: 8·2, 8·7: 210°·6: 24″·8.

Σ 1246. VIII^h 31^m·6, N. 10° 11′: 8·4, 9·4: 114°·1: 10″·3: y., o. A pretty pair.

Σ 1254. VIII^h 35^m·8, N. 19° 58′: 6·5, 9: 53°·9: 20″·5: vy., o. Two stars 7 and 8, form group.

ι (Σ 1268). VIII^h 41^m·9, N. 29° 3′: 4·4, 6·5: 307°·1: 30″·5: y., bl. Beautiful contrast. De., 4·2, 6·3. Σ 1266, in field, *sp*; 8, 9·2: 63°·5: 23″·5.

Σ 1276. VIII^h 42^m·8, N. 11° 27′: 7·9, 8·1: 354°·3: 12″·5.

Σ 1283. VIII^h 45^m·5, N. 15° 8′: 7, 8: 123°·3: 16″·5.

Hu. 1125. VIII^h 47^m·6, N. 32° 47′: 6, 13·5: 273°·9: 3″·9.

Σ 1288. VIII^h 48^m·6, N. 28° 43′: 8·9, 9·0: 259°·2: 7″·4.

σ^2 (Σ 1291). VIII^h 49^m·4, N. 30° 53′: 5·9, 6·4: 333°·3: 1″·5: y. Bies., '03: 325°·9. Good test: elongated $3\frac{7}{10}$-in. 80; divided 144. Bird, 'one of the loveliest pairs,' both crocus y., with minute *comes* (Es., 10·5: 70″ ± *s*).

64 (Sh. 100). VIII^h 54^m·6, N. 32° 44′: 5·6, 8·9: 294°·8: 89″·7.

α (h. 110). viii^h 54^m·1, N. 12° 10′: De., 4·5, 11: 325°·5: 11″·4. Sa. and h., w., red.

66 (Σ 1298). viii^h 56^m·5, N. 32° 34′: 6·1, 8·2: 137°·8: 4″·6: v. w., v. bl. Yw., bl., '51.

Σ 1297. viii^h 55^m·9, N. 23° 3′: 8·2, 9·3: 162°·2: 4″·7.

Σ 1300. viii^h 56^m·9, N. 15° 36′: 8·7, 8·8: 210°: 4″·1: y. Bowyer, '11: 195°·2: 5″.

Σ 1301. viii^h 57^m·2, N. 26° 32′: 8·5, 9: 0°·2: 10″.

Σ 1311. ix^h 2^m·9, N. 23° 19′: 6·7, 7·1: 200°·5: 7″·2. De., 6·4, 7·1, '68. Du., 0·1 diff., '69, '72. Ho., *comes*, 13: 118°: 27″·3.

Σ 1322. ix^h 8^m·2, N. 16° 51′: 7·7, 8·2: 52°: 1″·7. Bird, above two wide pairs.

Σ 1327. ix^h 10^m·8, N. 28° 15′: 8, 9·2, 9: 81°·4, 27°·9: 16″·1, 25″·1. Fr., '16: 73°·4, 21°·7: 10″·8, 26″·7: yw., 2 bls.

STARS WITH REMARKABLE SPECTRA, AND VARIABLES.

Es.-Birm. 261. viii^h 10^m·0, N. 24° 58′: 8·4: R.: III: Es.

R (var.). viii^h 12^m·2, N. 11° 58′: 6–11·3: 362^d. Schwerd.

V (var.). viii^h 17^m·2, N. 17° 32′: 7·5–13: 272^d·1. Auwers.

U (var.). viii^h 31^m·2, N. 19° 10′: 8·4 $<$ 14: 305^d: Chacornac.

S (var.). viii^h 39^m·4, N. 19° 19′: 8·2–9·4: 9^d·4: Algol type. Hind.

Es.-Birm. 279. viii^h 48^m·8, N. 19° 37′: 8·2: R.: D'A.: var. Es.

X (var.). viii^h 50^m·9, N. 17° 32′: 6·5: R.: Se. IV: D'A.: var. Es.

T (var.). viii^h 52^m·1, N. 20° 9′: 8–10·8: 482^d. Hind. IV: Es.

Var. ix^h 5^m·8, N. 31° 18′: 5·4–6·6. Har.

Clusters.

2632 (M. 44). VIII^{h} 35^{m}·5, N. 20° 16′. The Præsepe of the ancients, just resolved by the naked eye; too large for usual fields, but full of fine combinations. Two triangles will be noted; Galileo counted 36 stars in it, with his newly-constructed telescope.

2682 (M. 67). VIII^{h} 26^{m}·9, N. 12° 6′. Cl. (h., about 200 stars, 10–15 m^{g}.) visible in finder.

CANES VENATICI.

The nebulæ here are fine. The only prominent star is Cor Caroli.

Double Stars.

Σ 1606. XII^{h} 6^{m}·8, N. 40° 21′: 6·3, 7: 348°·6: 1″·4. Es., '16: 325°·8: 0″·9.

Σ 1607. XII^{h} 7^{m}·5, N. 36° 32′: 7·8, 8·3: 350°·3: 33″·1. β, '04: 2°·6: 29″·2. h. *comes*, β, 12·5: 310°·6: 21″.

Σ 1613. XII^{h} 8^{m}·5, N. 36° 13′: 8·5, 8·8: 18°·5: 1″·6. Bowyer, '11: 10°·8.

Σ 1615. XII^{h} 10^{m}·1, N. 33° 14′: 6, 8·2: 88°·3: 26″·9: y., ashy.

2 (Σ 1622). XII^{h} 12^{m}·1, N. 41° 7′: 259°·6: 11″·4: v. gold, bl. Yw., rosy, '48. De., y., azure. Fr., or., bl. Striking though not conspicuous; $\frac{1}{3}$ from Cor Caroli towards δ Leon.

Σ 1632. XII^{h} 16^{m}·3, N. 38° 21′: 6·5, 9·7: 193°·4: 10″·1: y., o.

Σ 1642. XII^{h} 21^{m}·9, N. 45° 11′: 8, 8·8: 183°·2: 2″·8. Bird, beautiful field.

Σ 1645. xii^{h} 24^{m}·2, N. 45° 14′ : 7, 7·5 : 161°·5 : 10″·4 : yw. Bird, ‘A lovely pair, as I ever saw.’

Σ 1653. xii^{h} 29^{m}·4, N. 32° 28′ : 8·3, 8·5 : 343°·2 : 7″·8.

Σ 1679. xii^{h} 42^{m}·3, N. 50° 16′ : 8·5, 9 : 208°·3 : 5″·5.

12 (Σ 1692). xii^{h} 52^{m}·3, N. 38° 45′ : 3·2, 5·7 : 227°·3 : 19″·9 : w., Cor. Caroli. W. or ysh., tawny or lilac, ’50. $3\frac{7}{10}$-in., ditto, little contrast, $5\frac{1}{2}$-in., ’62 ; pale y., fawn, ’65 ; pale y., pale copper, 9-in. ’70. h. saw no contrast, ’30–1. De., w., pale olive bl., ’56. K. v. pale y., pale lilac, ’65. Grover, creamy, fine bl., ’67. Fr., bright w., fawn, ’79 ; yw., fawn or pale ruddy, ’15. c.p.m. Unequal stars at nearly equal distances.

β 925. xii^{h} 53^{m}·0, N. 43° 59′ : 6·5, 12 : 211°·8 : 6″·6.

OΣ 257. xii^{h} 53^{m}·1, N. 46° 3′ : 7·5, 8·2 : 353°·6 : 13″·1.

Σ 1702. xii^{h} 54^{m}·8, N. 38° 43′ : 8, 8·5 : 82°·7 : 35″·7.

Σ 1718. xiii^{h} 2^{m}·0, N. 51° 25′ : 8·5 (Hu. double : 9·5, 10·5 : 203°·1 : 0″·3), 9 : 272°·4 : 13″·1.

β 930. xiii^{h} 2^{m}·3, N. 45° 41′ : 6·2, 11·3 : 116° : 2″·7.

15 (Σ I 24). xiii^{h} 6^{m}·5, N. 38° 55′ : 5·5 (β, double : 10·5 : 284°·9 : 1″·2), 5·9 : 297°·5 : 290″ : yw.

OΣ 261. xiii^{h} 8^{m}·3, N. 32° 32′ : 6·9, 7·4 : 353° : 1″·1 : ysh. Bowyer, ’11 : 344°·4 : 1″·6.

OΣ 263. xiii^{h} 13^{m}·2, N. 50° 59′ : 7·7, 8·5 : 133° : 2″·3.

Σ 1755. xiii^{h} 28^{m}·8, N. 37° 14′ : 7, 7·9 : 133°·8 : 4″·3 : yw., blsh. Bird, 7·9, grnsh. y.

OΣ 269. xiii^{h} 29^{m}·2, N. 35° 19′ : 6·5, 7 : 218°·2 : 0″·3. A., ’02 : 224°·2. Bin.

Σ 1758. xiii^{h} 29^{m}·6, N. 49° 33′ : 8, 8·2 : 311°·4 : 4″·2 : w. Bird, y. Es., ’00 : 305°·4.

25 (Σ 1768). xiii^{h} 33^{m}·9, N. 36° 42′ : 5·7, 7·6 : 76° : 1″·1 : w., bl. Single, De., ’31. Du., ’69. Schi., 0″·4, ’76. Bowyer, ’11 : 125°·1 : 1″·3. Bin.

Σ 1776. xiii^{h} 38^{m}·5, N. 46° 38′ : 8, 8 : 200°·2 : 7″·3.

OΣΣ 125. xiii^{h} 43^{m}·6, N. 38° 57′ : De., 5·2, 8·2 : 237°·4 : 71″·3 : w., azure.

Σ 1789. xiii^{h} 50^{m}·5, N. 33° 13′ : 8, 8·2 : 326° : 6″·1.

Stars with Remarkable Spectra, and Variables.

Y (var.). xii^{h} 41^{m}·4, N. 45° 52′ : 5·5 (var. Es.) R. : Hist. Cél. : IV. Se.

Es.-Birm. 378. xiii^{h} 19^{m}·7, N. 47° 25′ : 7 : yr. : III: D'A.

R (var.). xiii^{h} 45^{m}·5, N. 39° 56′ : 6·1–12·7 : 333^{d} : Es.

Es.-Birm. 389. xiii^{h} 57^{m}·0, N. 38° 16′ : 8·9 : yr. : III : var. : Du.

Nebulæ.

4111 (H. I 195). xii^{h} 3^{m}·0, N. 43° 34′. Oval, with nucleus. D'A., resolved.

4414 (H. I 77). xii^{h} 22^{m}·5, N. 31° 40′. Long; nucleus like star 11 m^{g}.

4449 (H. I 213). xii^{h} 24^{m}·3, N. 44° 32′. Oval, resolved. D'A., unequally double. E. of Rosse, 3 nuclei.

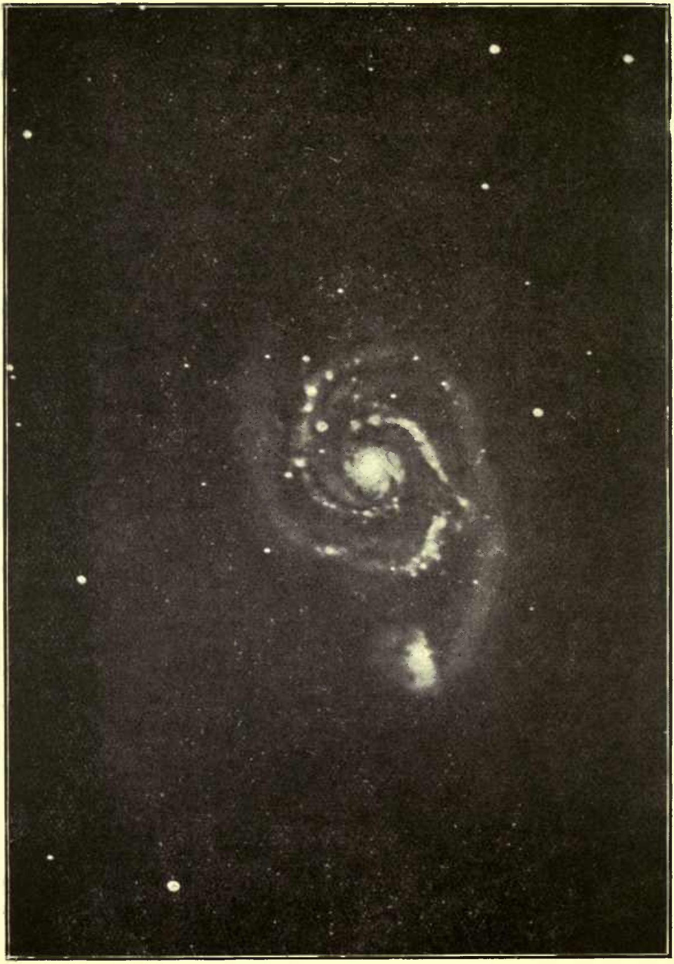
4490 (H. I 198). xii^{h} 26^{m}·8, N. 42° 5′. Long, easily resolvable. D'A., a small faint neb. *np*.

4631 (H. V 42). xii^{h} 38^{m}·2, N. 32° 59′. Very long ray (D'A., 13′). A small star *p*, and beyond it a small neb. Lick photo. shows two neb. probably joined.

4736 (M. 94). xii^{h} 47^{m}·1; N. 41° 33′. Small bright neb., like a comet; h., a nucleus; E. of Rosse, spiral. Lick spect., one bright band and two absorption lines.

5005 (H. I 96). xiii^{h} 7^{m}·2, N. 37° 27′. Long; nucleus. E. of Rosse, dark lanes ?

5055 (M. 63). xiii^{h} 12^{m}·2, N. 42° 27′. Oval; not bright. H. saw it 9′ or 10′ long, and near 4′ broad, with



THE SPIRAL NEBULA, M. 51, CANUM VENATICORUM.

Photographed at the Lick Observatory.

a very brilliant nucleus. An 8 m^{g}. star *p*, a minute triplet *f.* Lick photo spiral, with many knots. Huggins, spect. continuous.

5194 (M. 51). XIII^{h} 26^{m}·5, N. 47° 36′. E. of Rosse's wonderful spiral; its wreaths are beyond all but the first telescopes; common ones will only show two very unequal neb. nearly in contact, both brightening in the centre: traces of the halo encompassing the larger may perhaps be caught; Sm. could not do more; 'the enigma is another unequivocal mark of the illimitable power of the SUPREME CREATOR!' 9$\frac{1}{3}$-in. spec. showed plainly outer end of spiral, and junction with smaller neb. E. of Rosse, knots, well seen in modern photos. Huggins, spectrum not gas. A misty spot in finder 3° *sp,* Alkaid, at end of Great Bear's tail.

5272 (M. 3). XIII^{h} 38^{m}·5, N. 28° 47′. 'A brilliant and beautiful globular congregation of not less than 1000 small stars,' Sm., *blazing* splendidly, that is, running up into a confused brilliancy towards the centre, with many outliers. h., 11–15 m^{g}., making lines and irregular rays. $3\frac{7}{10}$-in. hardly resolved it. Buffham centrally resolved, 9-in. 'With' mirror; sprinkled over, and surrounded by the larger stars, and resolved 9$\frac{1}{3}$-in. spec. Photo with the 60-in. Mount Wilson shows 30,000 stars at least. Bailey finds 137 variable stars with mean P. of about half a day in this cl.

CANIS MAJOR.

α (Sirius). VI^{h} 41^{m}·6, S. 16° 35′. This is the leader of the host of heaven: a glorious object, in all likelihood either far greater or more splendid than our Sun. It has been perceived at midday with $\frac{1}{2}$-in. aperture. Hevel and Bond II. saw it with the naked eye in broad sunshine; and

Plummer has seen a shadow cast by it. Its colour has probably changed. Seneca called it redder than Mars; Ptolemy classed it with the ruddy Antares. Lynn, however, doubts the construction put on the evidence. I now see it of an intense white, with a sapphire tinge, and an occasional, probably, atmospheric flash of red. Hind and Pogson have found similar decided changes of colour in variable stars. In the spectrum of Sirius, and many white stars, the lines of hydrogen are abnormally strong, all those of the metals remarkably faint. The parallax of Sirius is some nine light years. From irregularities in the proper motion of Sirius and Procyon, Bessel fully believed that each was a member of a binary system, their companions being dark and invisible. This remarkable idea has been justified by A. Clark's discovery in 1862 of a 10 m^{g}. star, nearly at the required distance and angle, a most interesting object which, in 1862, according to Bond, was at 84°·5 : 10″·1 ; β found 52°·4 : 10″·8, '78 After this it rapidly closed up. β, 359°·7 : 4″·1, spring of 1890, and in the autumn it was lost even in the Lick 36-in. Innes, '13 : 80°·8 ; 9″·8 ; *comes* almost 9 m^{g}. He considers the Auwers Period, 49·4 years, best represents the observations. OΣ thinks its mass must be at least half that of Sirius, but its nature very different, or it would shine as 1 m^{g}. star. D. asks, 'Is it an enormously large globe endued with very small light-producing power ? or perhaps shining by reflection from Sirius.' Auwers assumes the ratio of the mass of Sirius to that of its companion is 2·05 to 1.

DOUBLE STARS.

h. 3863. VI^{h} 26^{m}·1, S. 22° 32′ : 6½, 9 : Doo., 119°·2 : 2″·7.

ν^{1} (H*h*. 239). VI^{h} 32^{m}·9, S. 18° 36′ : Cin., 5·7, 8 : 262°·9 : 17″·5. Y., pale violet, '51.

β 19. vi^{h} 38^{m}·4, S. 15° 55′ : De., 6·7, 9 : 165° : 3″·5.

h. 3891. vi^{h} 42^{m}·5, S. 30° 52′ : 6, 10. Doo., 221°·4 : 4″·7.

Σ 970. vi^{h} 44^{m}·1, S. 11° 38′ : 8·5, 9 : 128°·6 : 20″·1.

Σ 971. vi^{h} 44^{m}·7, S. 13° 20′ : 8·2, 8·5 : 331° : 1″·9.

A. C. 4. vi^{h} 45^{m}·3, S. 15° 4′ : De., 6, 8·7 : 286°·4 : 1″·1.

See 71. vi^{h} 49^{m}·8, S. 26° 51′ : 6, 14·7 : 100°·5 : 10″·6.

Σ 990. vi^{h} 50^{m}·7, S. 14° 9′ : 8·7, 9·3 : 274°·9 : 3″·3.

μ (Σ 997). vi^{h} 52^{m}·4, S. 13° 56′ : 4·7, 8 : 343°·5 : 3″·2 : y., bl. Do., '01 : 334°·5 : 2″·3.

ε (Maclear). vi^{h} 55^{m}·5, S. 28° 51′ : 2, 9 : 160°·6 : 7″·5.

See 74. vi^{h} 56^{m}·9, S. 21° 59′ : 6, 14·7 : 230°·4: 13″·8.

Σ 1011. vi^{h} 57^{m}·2, S. 15° 12′ : 8, 8·5 : 295°·7 : 4″·5.

Innes 183. vi^{h} 57^{m}·5, S. 25° 32′ : 6·5, 9·8 : 144°·4 : 3″·4.

β 328. vii^{h} 2^{m}·9, S. 11° 11′ : 6·2, 8 : 132°·3 : 0″·4, *comes* 12 : 350°·3 : 17″·4.

Σ 1031. vii^{h} 4^{m}·9, S. 13° 52′ : 8·3, 9 : 251°·6 : 3″·8. h. *comes :* β, 12 : 349°·7 : 12″.

h. 3945. vii^{h} 13^{m}·8, S. 23° 10′ : 7, 8 (Innes, 60°·6 : 27″·3) : orange, blue. 6·5, 8 : fiery red, gnsh. bl. Es. large star var. ?

Σ 1069. vii^{h} 14^{m}·4, S. 13° 23′ : 8·3, 8·3 : 193°·3 : 25″·4. Fr., '16 : 14°·9.

See 75. vii^{h} 14^{m}·5, S. 25° 50′ : 6·5, 13·7 : 7°·2 : 12″·4.

30 (h. 3948). vii^{h} 15^{m}·4, S. 24° 48′ : β, 6, 10·5, 11·5 : 90°, 80°·3 : 7″·8, 14″·3, with 8·7 : 78° : 84″·4.

See 76. vii^{h} 17^{m}·7, S. 26° 49′ : 6, 15 : 216°·4 : 7″·9.

See 78. vii^{h} 19^{m}·7, S. 25° 37′ : 6, 12·8, 12, 12·4 : 288°·4, 13°·6, 29°·9 : 2″·3, 3″, 6″·9.

Stars with Remarkable Spectra, and Variables.

Star. vi^{h} 17^{m}·7, S. 11° 45′ : 5·5 : Hy. : Har.

Es.-Birm. 188. vi^{h} 20^{m}·5, S. 27° 1′ : 8 : intense red ; h.

10. vi^{h} 41^{m}·4, S. 30° 59′ : 5·2 : Hy. : Har.
Star. vi^{h} 50^{m}·9, S. 23° 50′ : 6·5 : V. : Pickering.
Es.-Birm. 210. vi^{h} 55^{m}·0, S. 17° 1′ : pale ruby : W.
L 2617. vii^{h} 4^{m}·2, S. 23° 43′ : 5·7 : Hy. : Har.
Es.-Birm. 218. vii^{h} 4^{m}·3, S. 11° 46′ : 7·6 : R. : Hist. Cél. IV : Se. Var. Har.
27. vii^{h} 11^{m}·0, S. 26° 13′ : 4·7 : Hy. : Har.
ω. vii^{h} 11^{m}·6, S. 26° 38′ : 3·8 : Hy. : Har.
L 2718. vii^{h} 15^{m}·3, S. 24° 25′ : 4·9 : V. : Pickering.
R (var.). vii^{h} 15^{m}·8, S. 16° 15′ : 5·8–6·4 : 1^{d}·1 : Algol type. Sawyer.
Es.-Birm. 229. vii^{h} 19^{m}·7, S. 25° 37′ : 7¾ : R. : h.
Star. vii^{h} 21^{m}·0, S. 16° 2′ : 5·2 : Hy. : Adams and Lasby.
Star. vii^{h} 23^{m}·6, S. 22° 55′ : 5·5 : Hy. : Har.

Clusters.

2287 (M. 41). vi^{h} 43^{m}·6, S. 20° 40′. Superb group, visible to naked eye, '51, 4° beneath α. Larger stars in curves, with ruddy star (Es. var. ?) near centre, 5½-in. h. says the latter frequently occurs in cls. See note on Sagittarius, *infra.*

2360 (H. VII 12). vii^{h} 14^{m}·1, S. 15° 29′. Beautiful cl. h., 10 m^{g}. melting into a very rich neighbourhood, as though the Galaxy were approaching us. 64 includes a bright w. star *p*. Sm. notes that the stars are nearly all 10 m^{g}.; 3° *f* γ.

CANIS MINOR.

α (Procyon). (vii^{h} 35^{m}·1, N. 5° 27′.) A fine pale y. star, to which Schæberle added the *comes*, long predicted by Bessel (see under Sirius), with the Lick 36-in. in '96 at P. 320°·4 : 4″·6 : A., '05 : 6°·2 : 5″·1. 1912 invisible.

Barnard, '13: 42°·6: 5″·1. Mag. according to Lewis 10. Bin., for which See suggests 40 yrs. Several dist. attendants; one 23 sec. *f*, doubled by Bird 12-in. spec., '64: 9·5, 9·8; seen by Buffham, 9-in. 'With,' and found independently with 6-in. achr. by β as well as by De. 182°·6: 0″·8: '72. A., '96: 187°·7, β *comes* 13, 335°·2: 35″·9. 44 sec. *f* Procyon, 3′ *s* is Σ 1126: 7·2, 7·5: 132°: 1″·5: ysh. Ph., '14: 148°·9: 1″·2. Amici discovered *comes*; Sa., with 2½-in. est. 13: 240°: 25″. About 4^m *f* 19′ *s* is Es.-Birm. 249: 6·3: fine or., and 3^m *p*, 8′ *n*, Es.-Birm. 241: 8: pale ruby. Wa., pretty pair 35′ *n* of Procyon, and 2 *comites* to star 10 m^s. *p* Procyon. Vicinity very rich in small pairs and triplets.

DOUBLE STARS.

OΣ 170. VII^h 13^m·3, N. 9° 26′: 7·5, 7·5: 120°·6: 1″·2: y. Bowyer, '11: 107°·7: 1″·5.

Σ 1067. VII^h 14^m·7, N. 3° 1′: 7·7, 8·7: 265°·5: 25″·6.

Σ 1076. VII^h 16^m·8, N. 4° 13′: 8·7, 8·7: 106°·7: 2″·7.

Σ 1082. VII^h 19^m·4, N. 10° 52′: 8, 8·7: 326°·5: 19″·9. β, *comes*: 13·5: 21°·5: 15″·6.

Σ 1095. VII^h 23^m·0, N. 8° 55′: 8·3, 8·8: 78°: 9″·8.

η (β 21). VII^h 23^m·8, N. 7° 6′: 5·7, 11·2: 25°·8: 4″.

Σ 1099. VII^h 25^m·0, N. 11° 42′: 8·4, 9: 343°·4: 4″.

Σ 1103. VII^h 26^m·3, N. 5° 25′: 7, 8·5: 244°·5: 4″·3: v.w., ash.

Σ 1114. VII^h 29^m·3, N. 9° 28′: 8·5, 9: 53°·6: 6″·5.

Σ 1116. VII^h 30^m·1, N. 12° 29′: 7, 7·7: 111°: 1″·8.

Σ 1130. VII^h 37^m·3 N. 9° 54′: 8·4, 8·9: 162°: 2″. Ph., '14: 177°·5: 1″.

Σ 1137. VII^h 42^m·4, N. 4° 19′: 8, 9: 132°·7: 2″·8: ysh., bl.

Σ 1149. VII^h 45^m·3, N. 3° 25′: 7·3, 9: 40°·3: yw. Ysh., blsh. Pretty.

OΣ 182. VII^{h} 48^{m}·5, N. 3° 36′ : 7, 7·5 : 47° : 1″·1. Bowyer, ’11 : 32°·9 : 0″·8.

14 (H*h*. 284). VII^{h} 54^{m}·2, N. 2° 27′ : 6, 8, 9 : β, 75°·2, 151°·3 : 85″·8, 117″·2 : ’05. Blsh., bl., ’31. 6, deep yellow, ’51. 8 very little brighter than 9 : so Sa., ’76 ; Fr., full y., 8, 9 equal, ’77. Widening from p.m. of 6.

Σ 1181. VIII^{h} 1^{m}·1, N. 8° 25′ : 8, 9·5 : 140°·3 : 5″·2 : ysh., blsh.

Σ 1182. VIII^{h} 1^{m}·1, N. 6° 3′ : 7, 9 : 72°·6 : 4″·4.

STARS WITH REMARKABLE SPECTRA, AND VARIABLES.

R (var.). VII^{h} 4^{m}·3, N. 10° 9′ : 7·2–10 : 337^{d}·7 : Bonn.

S (var.). VII^{h} 28^{m}·4, N. 8° 29′ : 7–12·2 : 330^{d}·3 : Hind.

T (var.). VII^{h} 29^{m}·5, N. 11° 55′ : 9·1 $<$ 13·5 : 322^{d}·7 : Schönfeld.

Es.-Birm. 240. VII^{h} 32^{m}·3, N. 2° 15′ : 9·3 : R. : IV : Es.

U (var.). VII^{h} 37^{m}·0, N. 8° 34′ : 8·5–13·5 : 410^{d} : Baxendell.

CAPRICORNUS.

Not a conspicuous constellation, but containing some good objects, among which its principal star takes a high rank.

DOUBLE STARS.

3 (β 294). XX^{h} 12^{m}·0, S. 12° 35′ : 5·7 : *comes* (36°·2 : 27″·1) double : 13, 13·5 : 177°·9 : 8″·2.

α (Σ I 51). XX^{h} 13^{m}·6, S. 13° 2′ : 3·2, 4·2 : De., 291°·2 : 376″·1 : y. Noble pair, obvious to naked eye. α^{2} has *comes* (De., 151°·4 : 8″·3 : m^{g}. 11) obvious to Sa., 6½-in. spec. and β, 6-in. achr., seen by Wa. 4$\frac{3}{10}$-in. achr. A.G.C. doubled it (β, 240°·5 : 1″·2).

σ (H*h*. 682). xx$^{\text{h}}$ 14$^{\text{m}}$·8, S. 19° 37′ : β, 5, 8·3 : 177°·2 : 55″·8. Or., bl., '50 ; y., ruddy, *comes* 10 m$^{\text{s}}$., '70.

β (Σ I 52). xx$^{\text{h}}$ 16$^{\text{m}}$·5, S. 15° 17′ : 2·5, 6 : De., 267°·1 : 205″·3. Y., bl., '50. Minute pair between them (β, 322°·3 : 6″·4 : 13, 13·4). Very fine large field. Barnard doubled β^2 : 10·3 : 103°·1 : 1″·2.

Σ 2678. xx$^{\text{h}}$ 21$^{\text{m}}$·5, S. 8° 33′ : 9, 9·2 : 320°·7 : 3″·5.

π (Mitchel). xx$^{\text{h}}$ 22$^{\text{m}}$·7, S. 18° 28′ : De., 5·1, 8·7 : 145°·2 : 3″·3.

Σ 2683. xx$^{\text{h}}$ 23$^{\text{m}}$·9, S. 13° 25′ : 8, 8·5 : 67°·1 : 22″·8.

ρ (H*h*. 688). xx$^{\text{h}}$ 24$^{\text{m}}$·3, S. 18° 5′ : De., 5, 7·1 : 174°·1 : 2″·8 : w., ash. Pale y., ruddy purple, '50 ; a 7·5 *fs* viol., or lilac. β, *comes*, 13, between.

o^2 (H*h*. 689). xx$^{\text{h}}$ 25$^{\text{m}}$·3, S. 18° 51′. Wilson, 6·3, 6·8 : 239°·9 : 21″ 8. W., blsh., '50. c.p.m.

β 668. xx$^{\text{h}}$ 28$^{\text{m}}$·0, S. 10° 8′ : 6·2, 11·7 : 27°·3 : 4″·7.

Σ 2699. xx$^{\text{h}}$ 32$^{\text{m}}$·5, S. 13° 1′ : 8, 9 : 192°·2 : 9″·6. h., two *comites*.

τ (Hu. 200). xx$^{\text{h}}$ 34$^{\text{m}}$·8, S. 15° 14′ : 5·5, 6·8 : 269°·8 : 0″·2. A., '12 : 300°·4 : 0″·1.

h. 1567. xx$^{\text{h}}$ 39$^{\text{m}}$·9. S. 15° 17′ : β, 8, 10·5 : 345°·2 : 30″·5. Pretty pair, 8, 9 : lilac, perhaps blsh. grn.

h. 5228. xx$^{\text{h}}$ 40$^{\text{m}}$·5, S. 30° 45′ : 6½, 13 : Cin., 194°·6 : 10″·1.

h. 3003. xx$^{\text{h}}$ 48$^{\text{m}}$·3, S. 24° 5′ : 6, 11 : Doo., 216°·4 : 2″·5.

See 449. xxi$^{\text{h}}$ 26$^{\text{m}}$·9, S. 19° 35′ : 6, 12·8 : 197° : 1″·8.

41 (See 454). xxi$^{\text{h}}$ 37$^{\text{m}}$·5, S. 23° 37′ : 6, 13·5 : 198° : 5″·2.

Σ 2826. xxi$^{\text{h}}$ 43$^{\text{m}}$·1, S. 13° 31′ : 8, 8·5 : 82°·5 : 4″·3. Howe doubles 8 : 105°·5 : 0″·8.

Stars with Remarkable Spectra, and Variables.

R (var.). xx$^{\text{h}}$ 6$^{\text{m}}$·8, S. 14° 30′ : 9 < 13 : 344$^{\text{d}}$: Hind.

W (var.). xx$^{\text{h}}$ 9$^{\text{m}}$·8, S. 22° 13′ : 10·2 < 14·7 : 207$^{\text{d}}$·7 : Peters.

RT (var.). xx^{h} 12^{m}·4, S. 21° 34′ : 7·7–9 : ? : IV : Se.
Var. xx^{h} 23^{m}·1, S. 28° 32′ : 7·4–8·4 : ? : Har.
U (var.). xx^{h} 43^{m}·7, S. 15° 5′ : 10·2–14 : 202^{d}·5 : Pogson.
RR (var.). xx^{h} 57^{m}·6, S. 27° 44′ : 8–12 : 240^{d} : Cordoba.
RS (var.). xxi^{h} 2^{m}·8, S. 16° 45′ : 8·1–9·3 : ? : Har.
V (var.). xxi^{h} 2^{m}·9, S. 24° 14′ : 9–14·5 : 156^{d}·7 : Peters.
X (var.). xxi^{h} 4^{m}·0, S. 21° 40′ : 9·5 < 16 : 218^{d}·1 : Peters.
T (var.). xxi^{h} 17^{m}·6, S. 15° 30′ : 8·8–13·5 : 269^{d}·2 : Hind.
ϵ. xxi^{h} 32^{m}·6, S. 19° 50′ : 4·7 : Hy. : Har.

Cluster.

7099 (M. 30). xxi^{h} 35^{m}·8, S. 23° 32′. Moderately bright; beautifully contrasted with an 8 m^{g}. star beside it; comet-like with 64; with higher powers resolvable (into 12 m^{gs}. h.). 'What an immensity of space is indicated! Can such an arrangement be intended, as a bungling spouter of the hour insists, for a mere appendage to the speck of a world on which we dwell, to soften the darkness of its petty midnight? This is impeaching the intelligence of Infinite Wisdom and Power, in adapting such grand means to so disproportionate an end. No imagination can fill up the picture, of which the visual organs afford the dim outline; and he who confidently probes the Eternal Designs cannot be many removes from lunacy' (Sm.). E. of Rosse, spiral arrangement of branches. It lies closely *p* a little *n* from 41, a 5 m^{g}. star.

CASSIOPEIA.

Here lie a multitude of superb Galaxy fields. Birt found that the leader α is var.: 2·2–2·8: irregular. Snow always found it sharper and smaller, and more readily obscured by fog, than β or γ, even when equally bright.[1]

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[1] A difference in the aspect of different stars, independent of

DOUBLE STARS.

β (A. G. C. 15). 0^h 4^m·8, N. 58° 43′ : β, 2, 13·7 : 204°·2 : 22″·6. 2^m 46^s *p*, 43′ *s* is Σ 3062, 6·9, 8 : 87°·5 : 0″·8 : '31, an interesting Bin. which has now completed more than three-quarters of its orbit (Storey, '11 : 2°·1 : 1″·6), now again closing. Period about 111 yrs. 1^m 14^s *p* of this, 6′ *n*, is Σ 3057 : 7·2, 9·3 : 299°·6 : 3″·6 : ysh., ashy. Nearer β is a curious 8 m^g. triangle, suggesting (as so many others) actual, not optical vicinity ; one is β 485 : 307°·4 : 0″·4 : 8·7, 9. 15′ *n* of which is β 253 : 8·3, 8·4, 8·8 : 47°·2, 346°·3 : 0″·6, 39″·7. Fine region a little *f*.

Σ 16. 0^h 12^m·4, N. 54° 13′ : 7·7, 9 : 38°·2 : 5″·5. Bird, in a vertical curve. c.p.m.

β 392. 0^h 12^m·6, N. 61° 5′ : 6, 12·5 : 67°·8 : 19″·3.

Hu. 506. 0^h 20^m·2, N. 51° 36′ : 6, 8·5 : 217°·1 : 0″·2.

Σ 30. 0^h 22^m·8, N. 49° 32′ : 6·8, 8·7 : 295°·9 : 21″·2 : w., ash. Fr., '14 : 302°·3 : 17″·6. r.m.

magnitude, and sometimes of colour, has been noticed by several observers. Sm., speaking of a dull 11 m^g. star seen best by averted vision, remarks that 'there are many of much smaller magnitudes which shine quite sharply, and emit a strong blue ray.' Key says, 'We constantly meet with stars which loom large with a faint light, and others again very vivid, but contracted apparently to a point.' Babinet remarks that some stars have a peculiar power of overcoming twilight. A. gives ζ Aurigæ as a striking instance among others of singularly intense light for its magnitude. He says that red and yellow stars appear brighter in proportion to the superiority of the eye and instrument. Schm. finds that red stars gain in twilight, lose by night, as compared with wh. ones, and that the position of the eyes is of material consequence in such estimates. Es. notes that red stars gain nearly 0·5 m^g. in moonlight. Pickering finds that in the case of two equal stars the lower always *appears* the brighter.

β 1094. $0^h\,25^m{\cdot}7$, N. 59° 31′ : 5·7, 9·5 : 244°·6 : 0″·7.

λ (OΣ 12). $0^h\,27^m{\cdot}6$, N. 54° 5′ : 5·6, 5·9 : 304°·1 : 0″·5, '44. Hu., '02 : 152°·7. Bin.

h. 1041. $0^h\,35^m{\cdot}0$, N. 48° 56′ : OΣ, 6·3, 10·8 : 25°·6 : 14″·8.

α (H*h*. 11). $0^h\,35^m{\cdot}9$, N. 56° 6′ : β, 2, 9 : 280°·2 : 63″·2, two *comites* : 14, 14·5 : 106°·5, 272°·4 : 39″·7, 17″·6. Fine y., blsh., '50. 12^m *f*, 6′ *n* is a pretty quintuple β 1 (situated on the *np* edge of a large diffused neb. detected by Barnard) : 8·2, 9·8, 8·7, 8·7, 12·5 : 82°·6, 134°·2, 193°·7, 333°·1: 1″·4, 3″·8, 9″, 15″·8. Es., pair, 9^m *p* α, 14′ *n* : 8·1, 8·5 : 113°·3 : 6″·4 ; another 5^m *p*, 3′ *n* : 8, 9 : 158°·5 : 8″·7 ; pale or., pale bl.

o (β 231). $0^h\,40^m{\cdot}2$, N. 47° 51′ : 5·5, 12 : 303°·9 : 32″·8.

β 492. $0^h\,40^m{\cdot}7$, N. 54° 46′ : 5·7, 11·3 : 152°·7 : 2″·1.

Σ 59. $0^h\,43^m{\cdot}3$, N. 50° 59′ : 7·2, 8·1 : 145° : 2″·2.

η (Σ 60). $0^h\,44^m{\cdot}0$, N. 57° 23′ : 4, 7·6 : 88°·6 : 9″·7 : y., purp. Fr., '15 : 253°·3 : 6″·4. Y., pale garnet, '49, '50 : H. and South, red, grn. De., y., and generally red. Es. *comes* always pale red. Bin., which has now described about half its orbit. Es., pair, $6\frac{1}{2}^m$ *f* : 9·6, 9·8 : 112°·3 : 4″·9.

Σ 65. $0^h\,47^m{\cdot}6$, N. 68° 25′ : 8, 8 : 35°·1 : 3″.

β 497. $0^h\,48^m{\cdot}3$, N. 60° 40′ : 6 : distant *comes*, at 172°, double : 9, 11·5 : 150°·9 : 0″·9.

ν^1 (β 1098). $0^h\,50^m{\cdot}2$, N. 58° 32′ : 6, 13·5 : 75°·2 : 12″·8.

γ (β 1028). $0^h\,51^m{\cdot}9$, N. 60° 17′ : 2, 11 : 255°·9 : 2″·2. Se. and Huggins, bright lines, F. (variable), and many others. Beautifully contrasted with minute surrounding stars. 21′ *s* is β 1099 : 6·1, 6·8 : 270°·2 : 0″·1, '89. A., '12 : 341°·8 : 0″·3. Bin., closely *f* which Ingall has pointed out a pretty pair ; red, blue, '65. Es., 203°·2 : 21″·2. Orange, blsh.

Espin 45. 0^h 57^m·0, N. 49° 7′ : 6·2, 10 : 242° : 7″·9.

β 396. 0^h 58^m·6, N. 60° 39′ : 6, 10 : 66°·4 : 1″·3.

OΣ 23. 1^h 5^m·4, N. 51° 19′ : 7·5, 8 : 193° : 14″·6 : ysh.

Σ 96. 1^h 7^m·4, N. 64° 35′ : 7·8, 8·8 : 280°·9 : 1″·3.

Σ 97. 1^h 7^m·5, N. 51° 6′ : 8·5, 8·7 : 98°·6 : 4″·5.

β 258. 1^h 8^m·4, N. 61° 17′ : 6·3, 9·7 : 268°·2 : 1″. A., ’12 : 250°·8.

35 (OΣΣ 15). 1^h 15^m·7, N. 64° 15′ : Es., 6·5, 8·5 : 349°·7 : 52″·2 : w., or.

ψ (Σ117). 1^h 20^m·2, N. 67° 43′ : 4·4, 8·9 : 101°·8 : 32″·2 : v.y., o ; ’31. Do., ’00 : 108° : 27″·4. 8·9 double ; 9·5 : 253°·3 : 3″. β adds 13·5 to 4·4 : 44°·4 : 2″·8. 4·4, or., 8·9, bl. ’50. 5½-in. showed 8·9 double.

Σ 131. 1^h 27^m·8, N. 60° 16′ : 6, 9·2 : 142°·4 : 13″·6. Fr., y., bl.

Σ 130. 1^h 28^m·7, N. 69° 29′ : 8, 9 : 187°·7 : 7″·5 : ysh., ash.

OΣ 33. 1^h 32^m·1, N. 58° 16′ : 7·2, 8·3 : 74°·4 : 24″·3 : ysh., o. Fr., ’14 : 75°·9 : 25″·7.

44(β 1103). 1^h 37^m·9, N. 60° 9′ : 6·2, 12·5 : 3°·8 : 1″·7.

Σ 148. 1^h 40^m·3, N. 63° 25′ : 8·4, 9 : 130°·4 : 1″·4. Miller, ’04 : 141°·6.

Σ 163. 1^h 45^m·4, N. 64° 28′ : 6·2, 8·2 : 33°·6 : 35″ : red gold, bl. M^{gs}. high ? Cols. splendid. De., 6, 8·2. Es., 7, 8·5. Var. ? Fr., ruddy orange, bl.

Σ 182. 1^h 50^m·7, N. 60° 54′ : 7, 7 : 302° : 3″·6 : yw. Es., *comes* 13·5 : 75°·2 : 29″·9.

48 (β 513). 1^h 55^m·3, N. 70° 31′ : 5, 7·5 : 264°·4 : 1″ : ’78. A., ’12 : 159°·8 : 0″·5. Bin. See 25·95 y., now widening. *Comes*, 13·6 : 51°·2 : 23″·7.

Σ 191. 1^h 56^m·0, N. 73° 28 : 6·2, 8·5 : 190°·7 : 5″·6.

49 (β 785). 1^h 57^m·8, N. 75° 44′ : 6, 13 : 245°·7 : 5″·2.

0ΣΣ 26. II^{h} 13^{m}·9, N. 59° 39′ : De., 6·1, 6·6 : 199°·6 : 63″·5. Es., pale or., pale grn. 3 stars make a triangle.

ι (Σ 262). II^{h} 22^{m}·4, N. 67° 3′ : 4·2, 7·1, 8·1 : 276°·7, 107°·3 : 1″·9, 7″·6 : y., bl., bl. Ph., '14 : 250°·6, 111°·8 : 2″·1, 7″·4. Y., lilac, bl., fine, but easy object, $3\frac{7}{10}$, '50.

Σ 282. II^{h} 34^{m}·3, N. 65° 19′ : 8·3, 8·3 : 294° : 7″.

Σ 283. II^{h} 34^{m}·3, N. 61° 9′ : 8, 8·8 : 209°·2 : 1″·8 : y., ashy. β, *comes* 13·5 : 14°·6 : 18″·3.

Σ 306. II^{h} 44^{m}·9, N. 60° 1′ : 7·1, 9 : 93°·4 : 2″·1. De., *comes*, 11·5 : 156°·9 : 27″·5. Es., three others, 13·8, 13·5, 13 : 74°·3, 112°, 105°·6 : 17″, 19″·2, 27″·4. Three more distant. De., triplet *sf* : 8, 11, 11·5 : 21°·5, 11°·3 : 10″·7, 20″·3. β doubles 8 ; 8·7, 9·0 : 280°·7 : 0″·2.

Σ 335. II^{h} 57^{m}·9, N. 63° 27′ : 8, 8·5 : 158°·5 : 24″·4. Fr., '14 : 160°·1 : 23″·3.

0Σ 50. III^{h} 4^{m}·7, N. 71° 15′ : 7·5, 7·5 : 216°·1 : 1″·1. Storey, '09 : 196°·7 : 1″·5.

0Σ 496. XXIII^{h} 26^{m}·3, N. 58° 6′ : A, 5·4 ; B, 10 ; C, 7·4 ; D, 8·9 : AB, 337°·2 ; 1″·5. AC, 269°·2 : 76″·1. CD, 221°·9 : 1″·5 : wh., pale r., o., r. A, yw., C, pale lilac, '54. D. doubled C, Perry easy $6\frac{1}{2}$-in. h. *comes* to C (β, 11·6 : 337°·1 : 26″·9) ; two more distant, one of which is double. De., 9·2, 9·6 : 73°·5 : 10″·3. β finds star : 207°·6 : 231″·1 double, 9·4, 9·8 : 309°·1 : 0″·6.

h. 1896. XXIII^{h} 35^{m}·0, N. 61° 45′ : 6, 12 : β, 116°·7 : 16″·2.

Σ 3037. XXIII^{h} 42^{m}·2, N. 68° 1′ : 7, 8·5, 8·9 : 214°, 184°·4 : 2″·7, 28″·9 : v.y., bl., o. Es., 8·8 : 228°·2 : 50″·3.

Σ 3038. XXIII^{h} 42^{m}·3, N. 62° 13′ : 9, 9·5 : 275° : 4″·4.

6 (0Σ 508). XXIII^{h} 44^{m}·9, N. 61° 46′ : 5·7, 8·2 : 196°·2 : 1″·7 : vy., o. Fixed, but c.p.m.

Espin 700. xxiii^h 45^m·7, N. 53° 38′: 6·5, 10·5: 34°·9: 14″·6.

Σ 3047. xxiii^h 53^m·9, N. 56° 56′: 8·7, 8·7: 65°·6: 1″·2. Storey, '09: 70°·3: 1″. β, *comes* 12: 189°·8: 7″·9.

σ (Σ 3049). xxiii^h 54^m·9, N. 55° 18′: 5·4, 7·5: 323°·5: 3″: grn., v.bl. Wh., tawny, '50. Glorious low-powered field.

Σ 3053. xxiii^h 58^m·4, N. 65° 39′: 6, 7·3: 70°: 15″·2: vy., bl. Fr., '14: 71°·5.

Stars with Remarkable Spectra, and Variables.

Es.-Birm. 1. 0^h 5^m·2, N. 63° 30′: 8·7: R.: h. III: var.? Es.

T (var.). 0^h 18^m·9, N. 55° 21′: 6·9–12·3: 443^d·5: Krueger.

Star. 0^h 38^m·7, N. 64° 21′: 10: V: Har.

U (var.). 0^h 41^m·9, N. 47° 49′: 8–16: 276^d: Es.

Var. 0^h 42^m·0, N. 50° 50′: 7·2–8·6: ?: Har.

W (var.). 0^h 50^m·2, N. 58° 8′: 8·3–12·1: 404^d: Es.

Es.-Birm. 14. 0^h 53^m·0, N. 67° 16′: 8·8: OR.: h. III? Es.

S (var.). i^h 13^m·7, N. 72° 5′: 7·6–14·5: 609^d·5: Bonn. F. very bright at max. Es.

Es.-Birm. 32. i^h 50^m·1, N. 69° 49′: 8: R.: Ar. III: Es.

X (var.). i^h 52^m·9, N. 58° 53′: 9–12·3: 409^d: Es.

Es.-Birm. 54a. ii^h 35^m·3, N. 59° 22′: 8·2: R.: III? Es.

RZ (var.). ii^h 41^m·7, N. 69° 18′: 6·4–7·8: 1^d·2: Algol type. Müller.

SU (var.). ii^h 44^m·8, N. 68° 33′: 5·9–6·3: 1^d·95: Har.

V (var.). xxiii^h 8^m·2, N. 59° 15′: 7·1–12·4: 231^d·5: Anderson. Brown, 226^d·6.

Star. xxiii^h 11^m·7, N. 60° 1′: 9: V: Har.

Es.-Birm. 746. xxiii^h 20^m·3, N. 58° 44′: 9: R.: IV: Es.

R (var.). XXIII^{h} 54^{m}·3, N. 50° 56′: 5·3–12·8: 431^{d}·6: Pogson. Es., *comites*, 14, 10·5: β, 272°·7, 330°·9: 14″, 27″·8.

Es.-Birm. 762. XXIII^{h} 54^{m}·9, N. 62° 26′: ?: R.: Pickering.

Es.-Birm. 764. (OΣΣ 254). XXIII^{h} 57^{m}·2, N. 59° 55′ (De. 6·3, 7·7: 269°·6: 58″·9), R., bl. III or IV? Du. Several tiny pairs *n*, and pair 8·6, 9·2: 289°·5: 10″·1: y., bl.: 32′ *s*; another *p*. Es.

TEMPORARY STAR.

According to Ar., it was at 0^{h} 19^{m}·2, N. 63° 35′ that the Great New Star flamed out, Nov., 1572, speedily rivalling Venus, so as to be seen at noonday, then fading during sixteen months to utter extinction: there is some idea that similar appearances took place here in 945 and 1264; if so, we may possibly witness a repetition of this incomprehensible phenomenon. D'A. found a minute star, 10–11 m^{g} near its place, '65, where Ar. could formerly see none. So Es., '78, '80, '89, who has examined this and neighbouring stars without finding anything remarkable in their spectra. Safarik finds it var. The colour of the great star changed from w., through y. and r., to bl. Hind thinks that several var. stars increase bl., are y. after max., and flash red in decreasing.

CLUSTERS AND GROUPS.

κ. 0^{h} 28^{m}·6, N. 62° 29′: 4: w., '50. A little ysh., '55; stands in a grand region. One group resembles a capital Y.

225 (H. VIII 78). 0^{h} 38^{m}·8, N. 61° 21′. Fine cl., somewhat like the letter W; half way from γ to κ.

457 (H. VII 42). I^{h} 14^{m}·1, N. 57° 54′, is a very elegant group attending φ, 5 m^{g}. The second star lilac. Red star, 30′ *n*, a little *f* φ.

581 (M. 103). $1^{h}\,27^{m}{\cdot}9$, N. 60° 17′. Beautiful field. 1° *f* a little *n* of δ, containing Σ 131 *supra*, and red star.

663 (H. VI 31). $1^{h}\,40^{m}{\cdot}5$, N. 60° 51′. Visible in finder; field very good, 64; 80 showed Sm.'s little pair, Σ 153: 8·5, 9·7: 69°·2: 7″·5, but not his ruby, 8 m^{g}., '33.

7789 (H. VI 30). $\mathrm{xxiii}^{h}\,53^{m}{\cdot}0$, N. 56° 16′. Beautiful large faint cloud of minute stars; h., 11–18. 'A most superb cl.' 'A mere condensed patch,' as Sm. remarks, 'in a vast region of inexpressible splendour, spreading over many fields; including the whole Galaxy through this and the adjacent constellations.' [A beautiful group in a rich field lies about ¾° *f* δ. Glorious region between π and ο.]

CEPHEUS.

Much more barren to the naked eye than to the telescope. Splendid sweeps and curious groups between α, and the Galaxy.

DOUBLE STARS.

Σ 2.	$0^{h}\,4^{m}{\cdot}9$, N. 79° 16′: 6·3, 6·6: 341°·5: 0″·8: y., '30. A., '12: 128°·0: 0″·2. Bin. P. 156·6 yrs.
OΣΣ 1.	$0^{h}\,9^{m}{\cdot}6$, N. 75° 36′: De., 6·4, 7: 102°·4: 77″·1: Fr., '13: 75″·3.
Σ 13.	$0^{h}\,11^{m}{\cdot}6$, N. 76° 30′: 6·6, 7·1: 124°: 0″·5: yw., '31. Storey, '11: 89°·5: 0″·8. Bin.
Σ 34.	$0^{h}\,27^{m}{\cdot}5$, N. 77° 40′: 8·7, 8·8: 334°: 5″·8. Bird, *comes* to *f* star.
Σ 48.	$0^{h}\,37^{m}{\cdot}6$, N. 70° 56′: 7, 7·2: 333°: 5″·5.
Σ 170.	$1^{h}\,47^{m}{\cdot}9$, N. 75° 50′: 6·7, 7·5: 246°·8: 3″·2: yw., bl. w.
Σ 185.	$1^{h}\,54^{m}{\cdot}5$, N. 75° 7′: 7, 8·5: 40°·3: 1″·4. Storey, '09: 22°·2: 1″·2. Bin.

Σ 199. I^h 59^m·0, N. 67° 18′ : 8·5, 8·5 : 21° : 35″·8.

Σ 223. II^h 13^m·3, N. 76° 1′ : 8·5, 9 : 278°·4 : 2″·6.

Σ 320. II^h 55^m·4, N. 79° 6′ : 6·3, 9·5 : 227° : 4″·4 : gold, bl. Test for moderate instruments.

β 1176. III^h 10^m·1, N. 77° 27′ : 5·7, 12·5, 13·3 : 277°·6, 277°·9 : 1″·2, 10″·9.

Σ 419. III^h 34^m·6, N. 69° 35′ : 7·2, 7·2 (A., 7·3, 10 : 346° : 0″·4) : 73° : 3″·1.

Σ 460. III^h 56^m·6, N. 80° 29′ : 5·2, 6·1 : 352°·6 : 0″·9 : y., blsh. ’30. Storey, ’11, 58°·5 : 0″·8.

Σ 2326. XVIII^h 13^m·1, N. 81° 28′ : 7·7, 8·7 : 201°·7 : 15″·6 : w., ash.

κ (Σ 2675). XX^h 11^m·6, N. 77° 28′ : 4, 8 : 124° : 7″·4 : grnsh. w., bl. Wh. or ysh., bl. ’50.

β 1134. XX^h 20^m·1 N. 63° 44′ : 5·8, 12·7 : 80°·8 : 4″·3.

Σ 2685. XX^h 21^m·8, N. 63° 56′ : 8·5, 9·1 : 348°·8 : 4″·2.

Σ 2687. XX^h 24^m·4, N. 56° 23′ : 6·5, 8·3 : 119° : 26″·2 : w., ash.

Σ 3133. XX^h 55^m·9, N. 61° 3′ : 7·4, 8·9 : 102°·4 : 3″·6 : ysh., ash.

Σ 2751. XX^h 59^m·9, N. 56° 21′ : 6, 7 : 344°·1 : 1″·9. 24′ *n* is β 1139 : 6, 12·5 : 138°·6 : 1″·9.

Σ 2764. XXI^h 3^m·8, N. 61° 51′ : 8, 8·5 : 302°·2 : 6″·8 : Hu. divides 8·5 : 43°·6 : 0″·5.

Σ 2771. XXI^h 3^m·9, N. 70° 27′ : 8·8, 8·8 : 212°·6 : 2″·7.

Σ 2766. XXI^h 4^m·9, N. 58° 41′ : 8·3, 8·5 : 249°·3 : 5″·1.

Σ 2780. XXI^h 9^m·7, N. 59° 40′ : 6·2, 7·2 : 228°·8 : 1″·1. Storey, ’09 : 222°·5. Pale ruby, 7·5, *nf.*

Σ 2783. XXI^h 11^m·9, N. 57° 58′ : 8, 8 : 43°·2 : 1″·3. Storey, ’09 : 29°·4 : 1″·0.

Σ 2790. XXI^h 17^m·0, N. 58° 17′ : 5·6, 9·9 : 46°·6 : 4″·5. R., bl. ’32. Or., ’71. Barnard, *comes*, 15 : 183°·2 : 16″.

Espin 137. xxi^h 17^m·2, N. 61° 31′ : 6·5, dist. double *comes* at 74°. Doo., 9·3, 12·3 : 70°·3 : 2″·7.

Σ 2796. xxi^h 17^m·2, N. 78° 16′ : 7·3, 8·8 : 43°·8 : 24″·6 : w., ashy. Fr., '14 : 25″·5.

Espin 138. xxi^h 18^m·4, N. 60° 24′ : 6·5, 12·8 : 265°·2 : 8″·4.

Σ 2801. xxi^h 20^m·9, N. 80° 0′ : 7·3, 8 : 273°·1 : 1″·4 : y., ashy y. c.p.m.

Σ 2807. xxi^h 22^m·0, N. 82° 10′ : 8·2, 8·3 : 319°·6 : 2″·4.

OΣ 440. xxi^h 25^m·2, N. 59° 24′ : 6·2, 10·5 : 188°·8 : 12″·7 : gold, o.

β (Σ 2806). xxi^h 27^m·6, N. 70° 12′ : 3 (Spect. Bin.), 8 : 250°·0 : 13″·6 : grnsh. w., bl. W., bl., '50. Fr., grnsh. w., purple, '14.

Hu. 964. xxi^h 28^m·0, N. 66° 42′ : 6, 12·2 : 276°·6 : 1″·5.

Σ 2810. xxi^h 32^m·2, N. 58° 45′ : 7·5, 8·5 : 290° : 16″·9.

Σ 2812. xxi^h 32^m·5, N. 59° 18′ : 8·7, 9·2 : 126°·4 : 2″·1.

Σ 2813. xxi^h 33^m·6, N. 57° 7′ : 8·5, 9 : 272°·8 : 10″·1.

Σ 2816. xxi^h 36^m·5, N. 57° 8′ : 6·3, 7·9, 8 : 120°·1, 339°·7 : 11″·7, 20″ : ysh., blsh. w. β sees *comes* to 6·3 : 13·7 : 323°·5 : 1″·5. Es., *comes* 11·5 : 351°·9 : 54″.

Σ 2819. xxi^h 37^m·9, N. 57° 13′ : 7·5, 8·5 : 57°·2 : 12″·4.

Σ 2837. xxi^h 41^m·0, N. 82° 34′ : 8·5, 9 : 321°·3 : 2″·2. Storey, '10 : 294°·1 : 3″. r.m.

Σ 2827. xxi^h 41^m·9, N. 63° 14′ : 8·5, 9 : 210°·6 : 4″·3.

Σ 2858. xxi^h 44^m·8, N. 86° 30′ : 8·5, 8·7 : 164°·3 : 15″.

OΣ 451. xxi^h 48^m·6, N. 61° 14′ : 7·2, 8·2 : 222°·9 : 4″·5. De., pair 2′ *n*, 9·3, 10·3 : 131° : 3″·2.

Σ 2840. xxi^h 49^m·3, N. 55° 25′ : 6, 7 : 194°·1 : 20″ : grnsh. w., blsh. w. A splendid pair. Es., 6, pale y. Fr., '14 : 18″·8 : w., purple.

Σ 2843. xxi^h 49^m·6, N. 65° 22′ : 7, 7·2 : 133°·5 : 2″·4. Ysh.

Σ 2845. XXI^{h} 50^{m}·1, N. 62° 43′ : 8·2, 8·3 : 169° : 2″·2 : ysh. β, '05 : 172°·4 : 1″·7.

OΣ 457. XXI^{h} 53^{m}·4, N. 64° 56′ : 6·3, 8·5 : 241°·7 : 1″·4.

ξ (Σ 2863). XXII^{h} 1^{m}·4, N. 64° 14′ : 4·7, 6·5 : 288°·9 : 5″·6 : y., bl. Storey, '10 : 282°·7 : 7″·3. c.p.m. W., tawny or ruddy, '50.

Σ 2873. XXII^{h} 1^{m}·3, N. 82° 29′ : 6·2, 7 : 77°·3 : 13″·8 : w. β, '05 : 72°·6. Fr., ysh., blsh. '76.

15 (OΣ 461). XXII^{h} 1^{m}·6, N. 59° 29′ : 5·9, 10·6 : 299°·8 : 11″·1 : y., o. β, *comes* 13·5 : 334° : 18″·3. Fine field.

Σ 2860. XXII^{h} 1^{m}·7, N. 60° 28′ : 7·7, 9·3 : 250°·8 : 3″·3 : v.y., bl. '30. Storey, '10 : 253° : 8″·3.

19 (β 697). XXII^{h} 2^{m}·7, N. 61° 53′ : 5·7, 11·5 : 94°·4 : 19″·9.

Σ 2870. XXII^{h} 5^{m}·4, N. 60° 44′ : 8·2, 9·2 : 271°·6 : 5″·4.

Σ 2872. XXII^{h} 5^{m}·9, N. 58° 54′ : 7·2 : *comes* (316°·7 : 21″·4), double : 8, 8 : 334°·5 : 0″·5. Storey, '09 : 317°·0 : 0″·7.

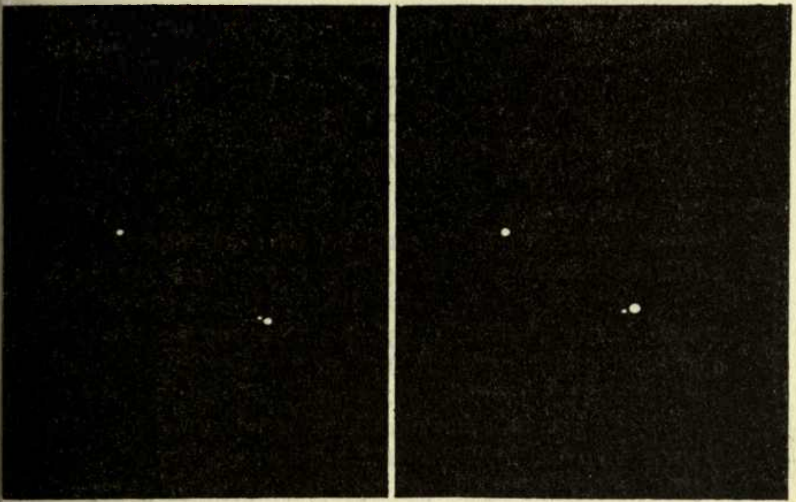
Σ 2883. XXII^{h} 8^{m}·8, N. 69° 44′ : 6·2, 8·2 : 254°·7 : 14″·9 : blsh. w., bl. Fr., 6·2, ysh., '76.

Σ 2893. XXII^{h} 11^{m}·4, N. 72° 55′ : 5·5, 7·6 : 348°·6 : 28″·8 : ysh., w. Fr., 7·6, bl., '14.

Σ 2896. XXII^{h} 15^{m}·9, N. 62° 49′ : 7·5, 8·5 : 241°·9 : 21″·5. Fr., '14 : 20″·6.

Σ 2903. XXII^{h} 19^{m}·3, N. 66° 18′ : 7, 8 : 96°·5 : 4″·2 : y., bl.

δ (Σ I 58). XXII^{h} 26^{m}·2, N. 58° 0′ : var., 5·3 : 192°·0 : 40″·9 : v.y., bl. Fr., '13 : 41″·7. β, *comes* 13 : 285°·7 : 19″·4. Especially fine pair, somewhat like β Cygni. Goodricke discovered the var. of δ, 4·6–5·3 : 5^{d}·3667. The leader of the Cepheid type of var. and Sp. Bin. The Light Period and change of brightness in this type is not to be accounted for by an eclipsing pair as in Algol and β Lyræ. Max. of light equals max. of approach. Min. of light equals max. of recession, according to Moore. Large field, $6^m f$, has three or. stars. $1^m p\ \delta$, 43′ *s* is Krueger 60, a pair 9, 9·2 : β, '90 : 56°·3 : 26″·8. Barnard, '15 : 59°·1 : 50″·3, from p.m. of 0″·95 in 9, β found 9 double : 9, 12 : 178°·8 : 2″·3, '90. Barnard, '15 : 69°·1 : 2″·5. Bin. A most interesting object. The *n* star of a triangle, the others 8·5 m^g.



1908, July. 1915, September.

PHOTOGRAPHS OF KRUEGER 60.

(Both photographs on the same scale.)

By Professor Barnard.

By kind permission of Royal Astronomical Society.

Σ 2923. XXII^h 31^m·0, N. 69° 57′ : 6·9, 9·2 : 46°·4 : 9″·3 : w., ash.

OΣ 480. XXII^{h} 42^{m}·9, N. 57° 39′ : 7·5, 8·2 : 117°·3 : 30″·9.

Σ 2947. XXII^{h} 46^{m}·2, N. 68° 9′ : 7·2, 7·2 : 76° : 3″. Storey, '10 : 65°·4 : 4″·2.

Σ 2948. XXII^{h} 46^{m}·7, N. 66° 8′ : 7, 8·7 : 5°·3 : 2″·8.

OΣ 482. XXII^{h} 47^{m}·8, N. 82° 44′ : 5·2, 9·9 : 31° : 3″·3 : v.y., o.

Σ 2950. XXII^{h} 48^{m}·2, N. 61° 16′ : 5·7, 7 : 319°·1 : 2″ : y., ash. Storey, '10 : 306°·4 : 2″·2. Fl., naked eye star, yet missed, by F., P., and Ll.

Σ 2963. XXII^{h} 52^{m}·2, N. 75° 55′ : 7·8, 8·5 : 354°·4 : 2″·4.

Σ 2961. XXII^{h} 53^{m}·4, N. 62° 27′ : 8, 8 : 348°·6 : 2″.

Σ 2971. XXII^{h} 55^{m}·1, N. 78° 4′ : 7·3, 8·5 : 5°·2 : 5″·3 : ysh., ash.

Hu. 994. XXIII^{h} 4^{m}·5, N. 63° 11′ : 6·3, 6·8 : 306° : 0″·2.

π (OΣ 489). XXIII^{h} 5^{m}·3, N. 74° 57′ : 5·2, 7·5 : 352°·4 : 1″·1 : v.y., purp. '46. Bies., '03 : 52°·2 : 0″·9.

Σ 2996. XXIII^{h} 9^{m}·4, N. 81° 23′ : 8·3, 8·7 : 109°·2 : 4″·9.

o (Σ 3001). XXIII^{h} 15^{m}·3, N. 67° 40′ : 5·2, 7·8 : 175°·0 : 2″·4 : v.y., v. bl. '32. Storey, '10 : 204°·6 : 2″·7. Y., ysh. gr. : not remarkable as a contrast '50.

Σ 3011. XXIII^{h} 22^{m}·0, N. 76° 38′ : 8·5, 8·8 : 334°·8 : 6″·9.

β 386. XXIII^{h} 22^{m}·8, N. 70° 14′ : De, 6·5, 11·9 : 312°·3 : 20″·1.

Ho. 200. XXIII^{h} 24^{m}·3, N. 85° 57′ : 6·5, 12 : 137°·7 : 1″·7.

Σ 3017. XXIII^{h} 24^{m}·4, N. 73° 40′ : 7·1, 8·2 : 35°·4 : 2″·4.

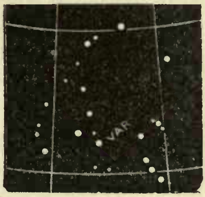
β 996. XXIII^{h} 48^{m}·4, N. 75° 6′ : 6·4, 12·5 : 68° : 5″·8.

Σ 3052. XXIII^{h} 58^{m}·8, N. 70° 54′ : 7·2, 7·8 : 7°·9 : 33″·5. Fr., '14 : 7°·4 : 34″·5.

Stars with Remarkable Spectra, and Variables.

δ. See under Double Stars.

U (var.). 0^{h} 55^{m}·1, N. 81° 26′·8 : 7–9 : 2^{d}·4 : Algol type. Ceraski. Blsh. at max. Ruddy at min., according to K. Incr., decr., and min. each 2^{h}. A diagram from one published by Lord Lindsay will assist in finding this object. K. and β, two *comites*; nearest, β, 11·2 : 62°·3 : 13″·8.



T (var.). xxi^{h} 8^{m}·5, N. 68° 10′ : 5·1–10·5 : 387^{d} : Ceraski.

Es.-Birm. 703. xxi^{h} 10^{m}·8, N. 59° 47′ : 7·5 : R. : Con. des temps. Var. B.

6. xxi^{h} 17^{m}·7, N. 64° 32′ : 5·2 : Hy. : Har.

Es.-Birm. 706. xxi^{h} 23^{m}·8, N. 62° 14′ : 8·8 : v. R. : III : Es.

S (var.). xxi^{h} 36^{m}·2, N. 78° 16′ : 7·9–13·1 : 485^{d}·8 : Hencke. Type IV.

μ (var.). xxi^{h} 41^{m}·1, N. 58° 25′ : 4–5 : irreg. The 'Garnet Sidus' of H., visible to naked eye, 2½° *s* of ν. Deep orange, 5½-in. '64, so Slack, '65, and 9⅓-in. '67. Fine III type. Wide pair 45′ *p*, 10′ n. β, *comes* to μ : 12 : 259°·4 : 19″·2.

18. xxii^{h} 1^{m}·5, N. 62° 44′ : 5·9 : Ry. : III : Du.

Es.-Birm. 725. xxii^{h} 9^{m}·7, N. 56° 52′ : 8·5 : R. in cl., h.

Es.-Birm. 729. xxii^{h} 22^{m}·0, N. 57° 26′ : 9·2 : R. : E. of Rosse.

CLUSTERS.

6939 (H. VI 42). xx^{h} 29^{m}·8, N. 60° 22′. An obscure cl. of very minute stars.

7654 (M. 52). xxiii^{h} 20^{m}·7, N. 61° 9′. Irreg. with or. star, as is frequently the case.

CETUS.

Large constellation, the leader, α (III type spectrum, and now inferior to β; one or both may have changed), is worth looking at, as a fine combination of a beautiful or. 2·5 m^{g}. star with 5·5, fine bl. Between them, *f*, is a pair 11 m^{g}., the *s* of which Wa. doubles, 11, 11: Copeland, 225°: 10″·2. Gore, two minute *comites* p, a^2.

Double Stars.

β 486. $0^{h}\ 10^{m}\cdot 4$, S. 8° 13′: 6, 12: 5°·2: 2″·8.

β 393. $0^{h}\ 14^{m}\cdot 2$, S. 21° 35′: 6, 8: 11°·4: 0″·8.

ι (h. 1953). $0^{h}\ 15^{m}\cdot 4$, S. 9° 16′: 4, 12: *β*, 17°: 62″·9.

12 (h. 322). $0^{h}\ 26^{m}\cdot 0$, S. 4° 24′: 6, 10·7: Doo., 190°·3: 9″·4.

Σ 39. $0^{h}\ 30^{m}\cdot 4$, S. 5° 0′: 6·8, 8·5: 45°·4: 20″·1: y.w., blsh. Fr., '14: 43°·4: 19″·3. Se. doubled 6·8: 237°·0: 0″·4. Doo., '10: 242°·1: 0″·7. M^{g}. 7·1, 9. 9 var.?

13 (Ho. 212). $0^{h}\ 31^{m}\cdot 3$, S. 4° 2′: 5·5, 6·2: 272°·2: 0″·3: Bin. A., 6·88 yrs. Also spect. Bin. 2·0818 days: *comes* 12·5: 65°·3: 38″, '77; 56°·9: 30″·1, '00, from p.m. of AB.

h. 323. $0^{h}\ 36^{m}\cdot 6$, S. 4° 47′: *β*, 6·2, 8·7: 289°·9: 65″·1. Y., violet, '50.

Σ 49. $0^{h}\ 36^{m}\cdot 7$, S. 7° 40′: 6·5, 10: 321°·5: 4″·5. *β*, '02: 6″·5 from p.m.

β 494. $0^{h}\ 42^{m}\cdot 9$, S. 1° 41′: 8, 8·2: 170°·6: 1″·4.

β 1160. $0^{h}\ 45^{m}\cdot 4$, S. 14° 0′: 5·8, 12: 113°·1: 1″·2.

26 (*Σ* 84). $0^{h}\ 59^{m}\cdot 7$, N. 0° 56′: 6·6, 9: 252°: 16″: w., ash. Pale y., bl., '55. c.p.m.

Σ 86. $1^{h}\ 0^{m}\cdot 7$, S. 5° 54′: 8·2, 8·7: 171°: 12″·1. Fr., '14: 153°·9: 13″·5.

Σ 91. $1^{h}\ 3^{m}\cdot 1$, S. 2° 9′: 6·7, 7·5: 328°·8: 3″·9: ysh., w. Do., '01: 310°·1.

37 (*Σ* I 3). $1^{h}\ 10^{m}\cdot 4$, S. 8° 21′: 5·1, 7: 331°·4: 50″·1: ysh., o. Y., lilac, or violet '50. c.p.m. *np* lies another

pair, Σ 101 : 7·5, 9·8 : 339°·3 : 21″·3 : y., o. Es., 9·8 : bl.

Σ 106. 1^{h} 12^{m}·2, S. 7° 34′ : 8·6, 8·7 : 308°·6 : 4″·6.

Σ 110. 1^{h} 13^{m}·8, S. 12° 45′ : 8, 8·5 : 356°·8 : 7″·3.

42 (Σ 113). 1^{h} 15^{m}·7, S. 0° 55′ : 6·2, 7·2 : 333°·6 : 1″·2. Furner, '12 : 0°·0 : 1″·6.

h. 2036. 1^{h} 16^{m}·0, S. 16° 14′ : Wilson, 7, 7·5 : 23°·9 : 1″·4. β, '01 : 15°·4.

β 1163. 1^{h} 20^{m}·1, S. 7° 20′ : 6, 6·2 : 192°·3 : 0″·2. A., '01 : 213°·2.

β 399. 1^{h} 23^{m}·8, S. 11° 20′ : De., 6·3, 10 : 302°·3 : 1″·6.

48 (See 14). 1^{h} 25^{m}·8, S. 22° 3′ : 6, 12·8 : 249°·6 : 22″·4.

Σ 147. 1^{h} 37^{m}·8, S. 11° 43′ : 5·3, 6·9 : 86° : 3″·5. c.p.m.

Σ 150. 1^{h} 39^{m}·4, S. 7° 29′ : 7·2, 7·8 : 195°·5 : 36″·2.

β 6. 1^{h} 40^{m}·7, S. 7° 10′ : De., 6·5, 9·2 : 167°·1 : 2″·6.

Σ 171. 1^{h} 44^{m}·7, S. 1° 49′ : 8·5, 8·5 : 157°·6 : 27″·9. Fr., '14 : 160°·7 : 31″·1. β doubles *comes* : 11·6 : 317°·4 : 3″·9.

χ. 1^{h} 45^{m}·7, S. 11° 5′ : 5, 7·5 : pale y., blsh. : wide pair.

58 (β 7). 1^{h} 53^{m}·9, S. 2° 27′ : 6·2, 11 : 12°·8 : 2″·7 : Test for 6-in. achr. About 2° *sp* 61. P. could not find 58.

h. 647. 1^{h} 58^{m}·4, N. 7° 18′ : β, 8·8, 9·3 : 35° : 26″·6. Blood red, green. 'Very intense and remarkable.' β, col. not very striking. Es., 9, fine red, III type.

61 (H. V 102). 1^{h} 59^{m}·7, S. 0° 43′ : 7, 11 : 193°·3 : 42″·7. *comes* very obvious with averted eye, 7 pale or., '50. B. another, 13 : β, 326°·3 : 80″. *f*, a little *s*, is Σ 218 : 7, 8 : 250° : 4″·8 : w., bl. A little *p*, pale ruby with dist. 11 m^{g}. ; *sp* 7 m^{g}. with 2 small *comites*.

66 (Σ 231). 2^{h} 8^{m}·7, S. 2° 46′ : 6, 7·8 : 228°·9 : 15″·5 : ysh., bl. Do., '01 : 232°·2. c.p.m.

Σ 265. II^h 20^m·4, S. 2° 7′: 8·2, 8·7: 136°·6: 12″. 24 sec. *f*, 21′ *s*, Σ 266: 8·2, 8·7: 268°·3: 7″·4.

β 518. II^h 25^m·3, N. 9° 13′: 6·4, 11·3: 138°·7: 1″·7.

Σ 274. II^h 27^m·4, N. 0° 45′: 7·2, 7·7: 218°·2: 13″·5.

Σ 276. II^h 28^m·4, N. 5° 59′: 8·8, 8·8: 253°·3: 2″·3.

Σ 280. II^h 30^m·1, S. 5° 59′: 7·5, 7·7: 349°·8: 3″·8: ysh.

ν (Σ 281). II^h 31^m·6, N. 5° 15′: 5, 9·6: 83°·3: 7″·7., y., ash.

84 (Σ 295). II^h 37^m·1, S. 1° 2′: 6, 9·2: 334°·6: 4″·9: y., ash. Doo., '99: 320°·6.

γ (Σ 299). II^h 39^m·2, N. 2° 54′: 3, 6·8: 287°·4: 2″·6: ysh., ash. c.p.m. 6·8, tawny, '50. De., olive grn., '54. Ash, '65. Fr., ruddy, or dusky, '76.

Σ 313. II^h 45^m·6, N. 8° 37′: 8·7, 9: 191°: 5″·4.

Σ 323. II^h 48^m·4, N. 6° 9′: 8, 8: 283°·2: 2″·5.

Σ 330. II^h 53^m·1, S. 0° 53′: 7·5, 9·5: 191°·1: 8″·8: v.y., blsh.

Σ 332. II^h 53^m·7, N. 0° 6′: 8·5, 8·5: 52°·9: 12″·7.

Σ 334. II^h 55^m·1, N. 6° 20′: 7·7, 8·2: 322°·8: 1″·6. Bowyer, '11: 314°·5.

β 528. III^h 4^m·4, S. 3° 54′: 8·5, 8·5: 197°·5: 1″. 6′ *np* Σ 358: 8·5, 11·3: 349°·3: 15″·2.

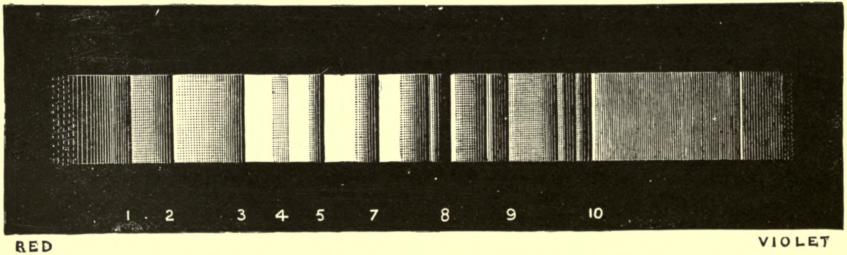
Σ I 6. III^h 4^m·9, N. 7° 9′: 7, 7: 162°·6: 81″.

94 (h. 663). III^h 8^m·7, S. 1° 30′: De., 5·5, 11·5: 253°·1: 5″·1: y., o. β, '04: 249°·3: 4″·4.

Σ 367. III^h 9^m·9, N. 0° 27′: 8, 8: 101°·4: 0″·9. β., '04: 210°·2: 0″·6.

95 (A.C. 2). III^h 14^m·3, S. 1° 14′: β, 6, 8·5: 112°·8: 0″·4. β, single, '90, '91. A., '06, 166°·4: 0″·4. Bin.

Σ 3046. XXIII^h 52^m·3, S. 9° 57′: 8, 8·5: 232°·2: 2″·5: yw. Hu., '02: 250°·7: 3″·1.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RED
VIOLET

SPECTRUM OF MIRA CETI.

STARS WITH REMARKABLE SPECTRA, AND VARIABLES.

Ll. 158. 0$^{\rm h}$ 10$^{\rm m}$·4, S. 8° 14′ : 5·8 : III : Har.
7. 0$^{\rm h}$ 10$^{\rm m}$·6, S. 19° 22′ : 5 : III : Har.
T (var.). 0$^{\rm h}$ 17$^{\rm m}$·7, S. 20° 30′ : 5·4–6·9 : Irr. : Chandler.
S (var.). 0$^{\rm h}$ 20$^{\rm m}$·0, S. 9° 46′ : 7·9–14·5 : 320$^{\rm d}$·2 : Borrelly.
υ I$^{\rm h}$ 56$^{\rm m}$·2, S. 21° 28′ : 4·1 : Ry. : III : Du.
Ll. 3717. I$^{\rm h}$ 56$^{\rm m}$·5, S. 9° 52′ : 5·8 : Ry. : III : D'A.
o (Mira). II$^{\rm h}$ 15$^{\rm m}$·3, S. 3° 20′ : 1·7–9·6 : 331$^{\rm d}$·6. Fabricius. h., very full ruby ; I found no trace of red, '78 ; α was ruddier. Fl., less red than gas flame. β, *comes*, 13 : 88°·5 : 75″·3. An 8·2 : 82°·4 : 116″. Period and brightness are not always the same. One of the most interesting problems of modern astronomy is the question whether the irregularities of some var. stars may not be like the *maxima* and *minima* of sun spots, phases of some general law. Such a connection has been shown by Professor Turner to exist in the case of S Persei and sun spots. Spectrum III type, with hydrogen lines beyond F bright, and sometimes F.
R (var.). II$^{\rm h}$ 22$^{\rm m}$·0, S. 0° 33′ : 7·8–14 : 167$^{\rm d}$: Ar.
U (var.). II$^{\rm h}$ 29$^{\rm m}$·9, S. 13° 30′ : 7·1–12·8 : 235$^{\rm d}$·8 : Sawyer.
X (var.). III$^{\rm h}$ 15$^{\rm m}$·3, S. 1° 22′ : 8–13 : 176$^{\rm d}$·5 : Wells.
V (var.). XXIII$^{\rm h}$ 53$^{\rm m}$·8, S. 9° 24′ : 8·5–14·5 : 261$^{\rm d}$: Peters.
W (var.). XXIII$^{\rm h}$ 58$^{\rm m}$·0, S. 15° 9′ : 6·5–12 : 366$^{\rm d}$: Skinner.

NEBULÆ.

584 (H. I 100). I$^{\rm h}$ 27$^{\rm m}$·3, S. 7° 17′ : round, bright centre. E. of Rosse and D'A. another fainter *sf.*

936 (H. IV 23). II$^{\rm h}$ 23$^{\rm m}$·6, S. 1° 32′. Faint, diffused, and very hazy object. Another *f.*

1055 (H. I 1). II$^{\rm h}$ 37$^{\rm m}$·6, N. 0° 6′. Faint neb. Es.

1068 (M. 77). 11^h 38^m·6, S. 0° 21′. 1° *f* δ, a little *s*. Small, faintish; very near 9 m^g. star. H. thought it at least 900 times more distant than 1 m^g. star! But qu. these inferences now? E. of Rosse, spiral, bl. L. O. spect. 5 bright lines and two dark ones.

COMA BERENICES.

A gathering of stars which obviously requires distance only to become a nebula to the naked eye. Sweeping poor, except nebulæ.

DOUBLE STARS.

2 (Σ 1596). xii^h 0^m·2, N. 21° 55′: 6, 7·5: 240°·6: 3″·7: w., bl. Yw., rosy, '48.

OΣ 245. xii^h 13^m·5, N. 29° 23′: 6·1, 10·2: 275°·1: 8″·3.

Σ 1633. xii^h 16^m·7, N. 27° 31′: 7·1, 7·2: 245°·1: 8″·7. Very pretty, solitary.

11 (Ho. 52). xii^h 16^m·7, N. 18° 14′: 5, 13: 43°·5: 9″·1.

12 (H*h*. 395). xii^h 18^m·5, N. 26° 18′: Σ, 4·5, 8·5: 167°·3: 66″·1. Y., rosy, '52: 8·5, pale bl., '72; K., grey lilac, '72; Fr., lilac, '77. β nearer star, 12·5: 54°·1: 35″. 1½° *sp* 16., the 'lucida' of the constellation, which is beautifully placed in a little triangle of 8 or 9 m^g. stars; curious row of 4 stars *p*.

Σ 1639. xii^h 20^m·4, N. 26° 2′: 6·7, 7·9: 290°: 1″·2: w., ashy w. Greenw., '12: 345°·1: 0″·6. Bin.

Σ 1643. xii^h 23^m·2, N. 27° 29′: 8·4, 8·7: 71°·2: 1″·9. Greenw., '12: 35°·7: 2″.

17 (Σ I 21). xii^h 24^m·9, N. 26° 22′: 4·8, 6: 250°·7: 145″·4. β doubles 6, 13·7: 156°·8: 1″·8.

Σ 1652. xii^h 28^m·5, N. 21° 33′: 9, 9: 181°·9: 6″.

24 (Σ 1657). xii^h 31^m·2, N. 18° 49′: 4·7, 6·2: 271°·9: 20″·4: y., v. bl.

Σ 1678. xii^{h} 41^{m}·4, N. 14° 49′ : 6·3, 7 : 211°·6 : 32″·6 : v.w., yw. β, '04 : 194°·3.

Σ 1685. xii^{h} 48^{m}·0, N. 19° 36′ : 6·8, 7·3 : 200°·8 : 15″·8 : w. Fr., yw.

32 (Σ I 23). xii^{h} 48^{m}·2, N. 17° 30′ : 5·3, 6·1 : 48°·4 : 194″·8 : yw.

35 (Σ 1687). xii^{h} 49^{m}·4, N. 21° 41′ : 5, 7·8 : 25°·3 : 1″·4 : ysh., bl. Ph., '14 : 89°·3 : 1″·1. Bin. *comes*, 9 : 124°·7 : 28″·6.

Σ 1696. xii^{h} 53^{m}·6, N. 30° 48′ : 8, 8·2 : 202°·5 : 3″·6.

Σ 1699. xii^{h} 54^{m}·9, N. 27° 55′ : 7·8, 7·8 : 1°·2 : 1″·5.

37 (β 1081). xii^{h} 56^{m}·4, N. 31° 13′ : 4·5, 13·8 : 351°·3 : 5″·1.

h. 2638. xiii^{h} 2^{m}·4, N. 29° 27′ : 6, 14, 15 : β, 218°·9, 7°·2 : 6″·5, 40″·3. β doubles nearer *comes* : 11·5, 11·7 : 237°·3 : 0″·5. Lewis, '01 : 221°·3.

Σ 1722. xiii^{h} 4^{m}·5, N. 15° 55′ : 7·8, 8·8 : 343°·9 : 3″·5 : ysh. blsh. Bies., '03 : 336°·8 : 3″·1.

42 (Σ 1728). xiii^{h} 6^{m}·1, N. 17° 57′ : 6, 6 : 9°·5 : 0″·6 : '27. An interesting Binary with the shortest period of all the Σ stars, the plane of the orbit being nearly in the line of sight, the two stars making an occultation about every 13 years, then widening to 0″·6, the position angle being invariable at about 190°. Period, See, 25·56 years. Greenw., '12 : 0″·2.

OΣ 266. xiii^{h} 24^{m}·5, N. 16° 7′ : 7·3, 7·8 : 324°·3 : 1″·2. Greenw., '12 : 343°·6 : 1″·9.

A 567. xiii^{h} 29^{m}·0, N. 24° 25′ : 5·8, 12·5 : 269°·3 : 1″·4.

Σ 1756. xiii^{h} 29^{m}·5, N. 23° 26′ : 8·5, 9 : 176°·8 : 14″·2.

Σ 1760. xiii^{h} 30^{m}·6, N. 26° 41′ : 8, 8 : 65° : 8″·5.

Stars with Remarkable Spectra, and Variables.

R (var.). xii^{h} 0^{m}·2, N. 19° 14′ : 8–15 : 361^{d}·8 : Schönfeld. 10 sec. *p*, 3′ *n* is a 7·5 : OR. : III : Es.

36. XII^{h} 55^{m}·0, N. 17° 50′ : 4·8 : OR. : III : D'A.
40 (var.). XIII^{h} 2^{m}·5, N. 23° 3′ : 5·5–5·9 : 37^{d} ? Guthnick.

Clusters and Nebulæ.

4147 (H. I 19). XII^{h} 6^{m}·0, N. 18° 59′. Globular cl.

4251 (H. I 89). XII^{h} 14^{m}·1, N. 28° 37′. Lengthened.

4274 (H. I 75). XII^{h} 15^{m}·8, N. 30° 4′. Oblong ; nucleus.

4278 (H. I 90). XII^{h} 16^{m}·1, N. 29° 43′. Nucleus like 10. m^{g}. star ; a faint neb. *nf* this.

4382 (M. 85). XII^{h} 21^{m}·4, N. 18° 38′. Fair specimen of the many neb. in this region ; midway from 24 toward 11, the nearest bright star *p*, a little *s*. D'A. ,fainter neb. *f*.

4494 (H. I 83). XII^{h} 27^{m}·4, N. 26° 13′. Near star 6 m^{g}.

4559 (H. I 92). XII^{h} 32^{m}·0, N. 28° 24′. h., club-shaped. L.P. spiral.

4565 (H. V 24). XII^{h} 32^{m}·4, N. 26° 26′. Long streak with parallel patch on *f* edge. 'Extraordinary phenomenon.' E. of Rosse, about 15′, nucleus projecting into dark lane, sky *p* neb. darker than elsewhere. Very faint $3\frac{7}{10}$-in. ; well seen, 9-in. spec. Lick photo. centre cut in two by dark (Absorption ?) Band, and there is a central star.

4725 (H. I 84). XII^{h} 46^{m}·5, N. 25° 56′. Star-like nucl. E. of Rosse, incomplete oval ring round it. L.P., spiral.

4826 (M. 64). XII^{h} 52^{m}·8, N. 22° 7′. Magnificent large bright neb. blazing to a nucleus. h., resolvable, nucl. probably double star, with vacuity below it. E. of Rosse, circular shaped, with dark and light spot on one side, around which is a close cluster of well-defined little stars. Rather faint $3\frac{7}{10}$-in. L.P., spiral.

5024 (M. 53). XIII^{h} 9^{m}·0, N. 18° 35′. Brilliant mass of minute stars (h., 11–15), blazing in centre. h., curved appendages. E. of Rosse, diam. 3′. Not very bright $3\frac{7}{10}$-in. ; beautiful 9-in.

CORONA BOREALIS.

A constellation resembling more than usual the object whose name it bears.

DOUBLE STARS.

Σ 1932. xv^{h} 14^{m}·9, N. 27° 7′ : 5·6, 6·1 : 273°·8 : 1″·6. Greenw., ’12 : 358°·3 : 0″·6.

Σ 1935. xv^{h} 16^{m}·9, N. 30° 59′ : 8·5, 8·7 : 290°·2 : 8″·4.

Σ 1936. xv^{h} 17^{m}·7, N. 27° 19′ : 8·5, 9 : 231°·9 : 20″·3.

η (Σ 1937). xv^{h} 19^{m}·9, N. 30° 34′ : 5·2, 5·7 : 35°·3 : 1″·1 : y. ’26. A., ’12 : 43°·7 : 0″·9. Disc. 1781 by H. Bin. 41·5 yrs., Do. Greatest dist. : 1″·1, P. 32° (1907), now closing with increasing angle. Least dist. 0″·45 at 270° about 1936. Split, but difficult, 9⅓-in. spec. ’78 when 0″·6. P.M. 0″·2 is increasing the dist. of a faint star *n* (β, ’98 : 16° : 54″·1).

Σ 1941. xv^{h} 22^{m}·3, N. 26° 54′ : 8·7, 8·7 : 232°·7 : 1″·6.

Σ 1950. xv^{h} 26^{m}·5, N. 25° 47′ : 6·7, 8·2 : 93°·2 : 3″·2 : gold, bl.

Σ 1963. xv^{h} 34^{m}·6, N. 30° 22′ : 7·3, 7·7 : 291°·2 : 4″·2. β, *comes* : 12·5 : 115°·9 : 31″. B, small pair, near.

Σ 1964. xv^{h} 35^{m}·2, N. 36° 30′ : 6·8, 7·3 : 86°·0 : 15″·4 : ysh. Σ, *comes* double : 8·8 : 8°·1 : 1″·3, and Hu. divides 6·8 : 89°·2 : 0″·8.

ζ (Σ 1965). xv^{h} 36^{m}·4, N. 36° 54′ : 4·1, 5 : 300°·9 : 6″ : grnsh, w., grnsh. Flushed w., blsh. grn. ’50.

γ (Σ 1967). xv^{h} 39^{m}·4, N. 26° 33′ : 4, 7 : 111° : 0″·7 : grnsh, w., purp., ’26. Bin. Lewis, 87·8 yrs. The plane of the orbit is nearly in the line of sight, and hence the change is mainly in distance. Greenw., ’12 : 114°·9 : 0″·7. Now closing with decreasing angle.

Σ 1973. xv^h 43^m·4, N. 36° 41′: 7·3, 8·5 : 323°·4 : 30″·6. Fr., '15 : 319°·9.

ε (A.G.C. 8). xv^h 54^m·3, N. 27° 7′: β, 4, 12·5 : 360°·2 : 1″·9. c.p.m.

τ (β 1087). xvi^h 6^m·1, N. 36° 42′ : 5½, 13·8 : 169°·1 : 3″·1.

OΣ 305. xvi^h 8^m·6, N. 33° 33′ : 5·8, 9·8 : 260°·5 : 5″·2.

Σ 2029. xvi^h 10^m·6, N. 28° 56′ : 7·5, 9·3 : 187°·5 : 6″·3.

σ (Σ 2032). xvi^h 11^m·7, N. 34° 1′ : 5, 6·1 : 134°·7 : 1″·4 : ysh., blsh. '36. Greenw., '11 : 217°·1 : 4″·9. Bin. of long period. Great divergence as to cols. South, *comes* 'certainly not bl.; it differs very little from large star in col,' '25. De., w., sometimes y., sometimes ashy, '54–'78. Se., *comes* sometimes bl., sometimes y., '55–7. K., v. pale y., bl., '71. *Comes* sometimes ruddy, sometimes blsh. to me, '50–'55, '62. Se., m^{gs}. very discordant. De., 5·3, 6·5 ; '54–'5, mean '63–'78 ; 5·8, 6·7. More than ½ mag. diff. to me, '55–'62. Σ, *comes* 10·5 : 88°·8 : 43″·7, '36. Lewis, '11 : 83°·2 : 65″·2. H., another, 13 : Ha., 221°·7 : 15″·9, '76. Hu., '98 : 209° : 11″·2, both altering from p.m. of σ (0″·3 towards 259°).

ν(Σ I 29). xvi^h 19^m·3, N. 33° 59′ : 4·8, 5·1 : 165°·6 : 371″·9 : y. Maiebckato, '91 : 366″·6 from p.m. Stars equal both deep y., '55, and a 6 m^g. grey, *f.* 5½-in. showed H.'s *comes* to ν^1 (β, 10·5 : 237°·5 : 67″·5). ν^2 has a *comes* 10 m^g., '50–'55 (β, 16°·2 : 103″·6).

Stars with Remarkable Spectra, and Variables.

U (var.). xv^h 14^m·9, N. 31° 56′ : 7·6–8·7 : 3^d·4 : Algol type : Winnecke.

S (var.). xv^h 18^m·1, N. 31° 39′ : 6·7–12·7 : 361^d·2 : Hencke.

R (var.). xv^h 45^m·3, N. 28° 24′ : 5·5–12·5. One of the most remarkable variables in the heavens, remaining sometimes for a year without alteration in light, sometimes falling rapidly. Es. finds var. in colour faint yellow to orange. The spectrum is peculiar, having bright lines, but probably not those of hydrogen. Sometimes bands appear. The bright lines have dark lines, as the star turns to orange, on the more refrangible side.

X (var.). xv^h 45^m·9, N. 36° 31′ : 8·3–14 : 250^d : Har.

V (var.). xv^h 46^m·7, N. 39° 49′ : 7·2–12 : 356^d·5 : IV. Dunér.

Z (var.). xv^h 53^m·0, N. 29° 29′ : 8$<$11 : 260^d : Har.

Es.-Birm. 446. xv^h 55^m·5, N. 36° 15′ : 8·8 : R. : h. : III.

T (var.). xv^h 56^m·2, N. 26° 10′ : 2–9·5. Found by B., May 12, '66, 2 m^g., falling afterwards to 9 m^g. ; reviving to 7, and 7·5, Aug. 20, Oct. 5. Backhouse found it irregularly decreasing, '72. h. gave it 6·3 m^g., '42. A., 9·5, '55. Es., '92 : 9·1, type III. Barnard, '07 : 9·4, colourless. The spectrum seems at the outburst to have resembled the variable stars, in having bright hydrogen lines. Similar outbursts on a smaller scale have been noted at Har. in the case of Z Andromedæ, and RS Ophiuchi. In the case of all these the star seems to return to its original magnitude and without showing the neb. spectrum. It is to be noted that none of these stars are near the central line of the Galaxy.

W (var.). xvi^h 12^m·5, N. 38° 0′ : 7·8–14 : 244^d : Anderson.

CORVUS.

This small constellation contains several conspicuous stars.

DOUBLE STARS.

β 920. xii^{h} 11^{m}·6, S. 22° 54′ : 6·5, 7·0. Doo., '05 : 257°·1 : 1″·2 ; angle increasing.

β 921. xii^{h} 13^{m}·8, S. 23° 34′ : 7·5, 11·6 : 218°·5 : 3″·1.

β 605. xii^{h} 16^{m}·0, S. 21° 43′ : 6·2, 8·4 : 143°·8 : 1″.

ζ (β 1245). xii^{h} 16^{m}·4, S. 21° 46′ : 5·5, 13·8 : 42°·3 : 4″·8. A., '12 : 54°·2 : 7″·8.

β 606. xii^{h} 21^{m}·9, S. 14° 30′ : 7·2, 8·2 : 99°·1 : 1″·2.

δ (H*h*. 396). xii^{h} 25^{m}·7, S. 16° 4′ : De., 3, 8·5 : 214° : 24″·3. Yw., lilac, '51. c.p.m.

β 28. xii^{h} 25^{m}·9, S. 12° 57′ : De., 6·4, 10·2 : 353°·7 : 1″·8. Doo., '05 : 11°·7 : 2″·2.

Σ 1664. xii^{h} 34^{m}·2, S. 11° 3′ : 7·7, 8·8 : 271°·6 : 17″·1 : y., bl. '30. β, '04 : 242°·7 : 23″·6.

Σ 1669. xii^{h} 37^{m}·1, S. 12° 33′ : 6·5, 6·5 : 298°·9 : 5″·4 : yw. Hu., '04 : 306°·5. Sa., *comes* : 10·5.

Hu. 738. xii^{h} 39^{m}·6, S. 11° 34′ : 6·3, 11·5 : 243°·6 : 6″·5.

VARIABLES.

R (var.). xii^{h} 15^{m}·5, S. 18° 48′ : 7·5–12·6 : 318^{d}·5. Karlinski. 5 sec. *f*, 4′ *n*, is a 7·8 : yR. : III. Du.

β. xii^{h} 30^{m}·0, S. 22° 57′ : pale y., '52, is inserted to be watched for var. Sm. found, '31, that though possessing no Arabic name, and lettered β by Bayer, it was unquestionably the brightest in the constellation. H., 1783, gave the order, γ, δ, β, α ; 1796, γ, β, δ, α, with but little diff. between them. I found them, '52, '54, '59, '61, γ, δ, β, α. Fr., '78, γ, δ, β, ε, α. Gould considers that β, γ, δ, ε are all subject to change. Pickering finds the spectra of γ, δ, of type I, while α, ε, β are varieties of type II. The diff. of colour may have something to do with the apparent var. γ has been found to be a spect. Bin. by the Lick observers.

NEBULA.

4361 (H. I 65). xii$^{\text{h}}$ 20$^{\text{m}}$·4, S. 18° 20′: H., resolvable. Nucleus.

CRATER.

Like Corvus, an appendage of Hydra.

DOUBLE STARS.

A 1774. x$^{\text{h}}$ 59$^{\text{m}}$·5, S. 10° 53′: 6, 10·5: 269°·4: 3″·7.

Σ 1509. xi$^{\text{h}}$ 2$^{\text{m}}$·5, S. 12° 59′: 7·2, 9: 15°·2: 32″·9: y., o.

β 220. xi$^{\text{h}}$ 8$^{\text{m}}$·5, S. 18° 4′: De., 6·4, 6·9: 143°·6: 0″·6.

Σ 1530. xi$^{\text{h}}$ 15$^{\text{m}}$·7, S. 6° 28′: 7·8, 8·2: 314°·6: 7″·6. 10 m$^{\text{g}}$. pair in field. About 45′ *p* is a fine pair. H*h*., 368: 7, 9: w., blsh. β, 97°·4: 60″·5, who doubles principal star, 6½, 12: 226°·4: 1″·2. A., '98: 240°·6.

γ (h. 840). xi$^{\text{h}}$ 20$^{\text{m}}$·9, S. 17° 15′: 4, 9·5: Doo., 96°·7: 5″·1.

β 1078. xi$^{\text{h}}$ 35$^{\text{m}}$·8, S. 14° 1′: 6·3, 12·2: 49°·8: 8″·2.

β 1079. xi$^{\text{h}}$ 56$^{\text{m}}$·6, S. 21° 20′: 6·2, 13·3: 147°·9: 11″·7.

STAR WITH REMARKABLE SPECTRUM, AND VARIABLES.

R (var.). x$^{\text{h}}$ 56$^{\text{m}}$·6, S. 17° 53′: 8–9: irr.: Baxendell. h., 'scarlet, almost blood-colour, a most intense and curious col.' Closely *f* α. III type. A star 9 m$^{\text{g}}$. (K., 10, '66), pale blue *p*.

Es.-Birm. 336. xi$^{\text{h}}$ 47$^{\text{m}}$·2, S. 10° 46′: 8·4: R.: III: Es.

S (var.). xi$^{\text{h}}$ 48$^{\text{m}}$·6, S. 7° 10′: 8·2–9·2: ?: Har.

CYGNUS.

This fine cruciform constellation occupies a prominent position in the Galaxy, and its low-powered fields are overpowering in magnificence. The region *s* of γ is remarkable as containing many red stars (which led B. to call this part of the heavens the 'Red Region of Cygnus'), also there is here a group of V type stars. The principal star, Deneb, has no perceptible parallax or proper motion; so far deserving the title, usually very inappropriate, of a fixed star; hence we must infer amazing distance, and magnitude surpassing possibly that of Arcturus, Wega, or even Sirius itself. Huggins believes that it is approaching us at about 39 miles per second. The Galaxy near γ begins to separate into two streams. Pickering finds that Sirian stars have a marked affinity for the Galaxy, and Monck that solar stars lie usually outside of it, and are more uniformly distributed, and have larger proper motions. Hence it is inferred that the solar stars are separate from the Sirian, and nearer to us. Du. notes that IV type stars are mainly found near the medial line of the Galaxy, and the further they are from it the brighter they are. Es. finds that the V type stars accumulate at the bifurcation of the Milky Way. Almost all the temporary stars have appeared in this part of the heavens. Planetary nebulæ are also closely associated with this part of the Milky Way, and it is a highly suggestive fact that while the Nova Aurigæ and other Novæ turned into planetary nebulæ, we have no case of a nebula condensing into a star.

DOUBLE STARS.

Σ 2479. XIX^{h} 7^{m}·7, N. 55° 12′ : 7, 9·4 : 38°·0 : 6″·6. De., 7 double, 20°·2 : 0″·6. Storey, '10 : 13°·6 : 0″·5.

Σ 2486. xix^h 10^m·0, N. 49° 41′ : 6, 6·5 : 224°·8 : 10″·5 : y. : '32. β, '05 : 217° : 9″·2. Equal, '71, so Fr., '76. Large c.p.m., singular and beautiful field.

Σ 2507. xix^h 17^m·3, N. 44° 13′ : 8·2, 9·3 : 136°·7 : 23″·9. Fr., '14 : 140°·2 : 26″. h., *comes* to 9·3, β, 102°·4 : 6″·5.

β 1129. xix^h 19^m·8, N. 52° 13′ : 6·3, 6·3 : 344°·3 : 0″·3. A., '06 : 389°·2.

Σ 2522. xix^h 22^m·6, N. 28° 36′ : 7·5, 9 : 239°·2 : 4″·4.

Σ 2525. xix^h 23^m·3, N. 27° 10″: 7·4, 7·6 : 255°·9 : 1″·3 : ysh. Greenw., '12 : 306°·3 : 0″·7.

Σ 2524. xix^h 23^m·3, N. 25° 20′ : 8·3, 8·5 : 104°·6 : 7″·2. Bowyer, '12 : 98°·9 : 6″·6.

Σ 2534. xix^h 24^m·8, N. 36° 22′ : 7·8, 8 : 62° : 6″·8, v.w. W., bl., '50. Fine field, closely *f* 4.

Pair. xix^h 26^m·7, N. 28° 33′ : 7·5, 12 : est. 90° : 40″ : R., intense bl. B.

β (Σ I. 43). xix^h 27^m·5, N. 27° 47′ : 3, 5·3 : 55°·7 : 34″·3, y., bl. One of the finest in the heavens. I have seen the cols. beautifully by putting the stars out of focus. Sm. observes that they are actually different, not, as may sometimes be the case, complementary, from mere contrast; an effect which is seen when the bright y. light of a lamp makes the moon appear blue, and which Schm. witnessed to a remarkable degree at his observatory on Vesuvius during the great eruption of '55, when the sky was as green as bottle glass, and the full moon a lively green through openings in red clouds of smoke and steam. A similar result may take place with some double stars, but not with all, as is proved by hiding the larger star behind a bar in field. Hence artificial light is misleading in estimating star cols. 3 has been suspected of var. Huggins finds the spectra of the pair complementary.

Σ 2538. xix^{h} 28^{m}·5, N. 36° 32′ : 8·2, 8·3 : 245°·3 : 53″. 8·3, *comes*, 8·7 : 52°·6 : 6″·1. β, *comes* to 8·2 : 13 : 40°·9 : 4″·4, and a minute star between the pairs.

Σ 2539. xix^{h} 28^{m}·9, N. 28° 6′ : 7·9, 9·7 : 5°·2 : 5″·4. β, *comes* 13 : 328° : 4″·8.

Σ 2542. xix^{h} 31^{m}·0, N. 52° 49′ : 8·2, 8·7 : 254°·1 : 11″·3.

Group. ± xix^{h} 31^{m}, N. 28° 26′. Two pairs and triplet.

θ (β 1131). xix^{h} 34^{m}3, N. 50° 2′ : 5, 14·5 : 43°·9 : 3″·6.

Ho. 111. xix^{h} 36^{m}·7, N. 33° 47′ : 6·5, 11 : 0°·8 : 0″·8. *Comes* 12·1, Doo., 270° : 24″·3.

OΣ 382. xix^{h} 38^{m}·8, N. 27° 4′ : 7·7, 7·6 : 355°·3 : 0″·3. 2^{m} *f*, 16′ *n* is β 658 : 6·5, 10 : 295°·2 : 0″·6.

16 (Σ I. 46). xix^{h} 39^{m}·7, N. 50° 20′ : 5·1, 5·3 : 136°·3 : 37″·3 : yw. c.p.m.

Ho. 453. xix^{h} 40^{m}·8, N. 33° 59′ : 6·5, 13 : 49°·2 : 15″·5.

OΣ 384. xix^{h} 41^{m}·0, N. 38° 8′ : 7, 7·3 : 195°·9 : 1″.

Σ 2576. xix^{h} 42^{m}·5, N. 33° 26′ : 7·8, 7·8 : 318°·8 : 3″·6 : y. Bowyer, '12 : 286°·3 : 2″. β, two small *comites*.

δ (Σ 2579). xix^{h} 42^{m}·5, N. 44° 56′ : 3, 7·9 : 40°·7 : 1″·9 grnsh., ash., '26. Bies., '11 : 287°·6 : 1″·6. Disc. by H. in 1783. Difficult because *comes* falls on interference ring ; often easy in twilight, but invis. in a dark sky. Du. says, 'Rarement j'ai observé l'étoile après le coucher du soleil.' *Comes* has been thought var. in col. (red to blue) and mag. Noble has seen it with 4$\frac{1}{8}$-in. achr. Slow Bin. Ellison, several dist. *comites*. Es. one, at 64°·4, 130″, double : 11·5, 12·5 : 310°·4 : 2″·6, with *comes f*. D., pair : 7·5, 11·2 : 266° : 2″·3, 12′ *s*. Es., another ; 9·3, 9·5 : 214°·7 : 7″·7, 10′ *sf*.

Webb, pair, 6$^{m\cdot}$ *f*, Holmes adds *comes*. Es., another fainter; Es., 7·5, 11·6, 15, 9: 134°·8, 103°·3, 327°: 7″·9, 10″·7, 31″·5. 7·5 is orange. Fine group 1½° *n* of δ.

Σ2578. xix^h 42^m·7, N. 35° 54′: 6·6, 7·4: 126°·8: 14″·8. Wa., several minute *comites*.

OΣΣ 191. xix^h 42^m·9, N. 34° 49′: De., 6, 8: 28°·1: 38″·1: y., azure. Orange, bl., '49. Beautiful.

χ^1 (Σ2580). xix^h 43^m·4, N. 33° 33′: 5·1, 8·1: 73°·4: 25″·7: v.y., bl. c.p.m., beautiful field.

OΣΣ 192. xix^h 43^m·5, N. 32° 42′: De., 6, 8: 202°·3: 32″·1: gold, or y., bl. Ho., adds 13: 238°·6: 3″·1, and β, 14: 215°·4: 9″·7.

OΣ 386. xix^h 45^m·6, N. 36° 58′: 7·7, 8: 77°·5: 1″.

Espin 84. xix^h 46^m·6, N. 38° 31′: 6·5, 11·6: 156°·3: 11″·4. β *comes* 12: 98°·2: 22″·4.

OΣ 389. xix^h 48^m·7, N. 30° 57′: 6·9, 8·8: 183°: 12″·8. Es., *comes* 12: 306°·5: 9″·4.

η (β 980). xix^h 53^m·3, N. 34° 52′: 5, 13: 209°·6: 7″·1, with two dist. 11·5. Curious trapezium, 10^m *f*.

ψ (Σ2605). xix^h 53^m·6, N. 52° 13′: 5, 7·5: 184°·6: 3″·3, w., ash. W., lilac, '50. Fr., 5, grnsh. w., '76.

OΣ 393. xix^h 55^m·3, N. 44° 10′: 7·5, 8·4: 227°·4: 21″·2: rsh., blsh. Es., '13: 20″·1.

Σ2607. xix^h 55^m·2, N. 42° 3′: 7·2, 9: 293°·4: 3″·2: w., ash, '31. Or., bl., 9-in. spec., '71; so Fr., '76. Heis., 6 m^s. De., 6·8, 8·3; OΣ, 7·2, double; *comes* 9: 321°·9: 0″·4, '44. Lewis, '04: 305°·4: 0″·3. Bin.

Σ2606. xix^h 55^m·4, N. 33° 3′: 7·5, 8·2: 131°: 1″·2.

Σ2609. xix^h 55^m·7, N. 37° 53′: 7, 8·1: 29°·1: 2″·4.

Σ2610. xix^h 56^m·1, N. 35° 19′: 8·1, 8·6: 298°·4: 4″·3.

Σ2611. xix^h 56^m·4, N. 47° 8′: 8, 8: 26°·4: 5″·1.

OΣ 394. xix^{h} 57^{m}·2, N. 36° 12′ : 7, 9·8 : 295°·4 : 11″. Es., orange, bl. 34^{s} *f*, 11′ *n* a pretty quadruple : 7 w., 10 r., 11, 11·5 bl.

Σ 2619. xix^{h} 58^{m}·7, N. 48° 3′ : 8·1, 8·1 : 244°·9 : 4″·3. h., *comes* 12. OΣ another.

26 (OΣΣ 197). xix^{h} 59^{m}·1, N. 49° 53′ : De., 5·3, 8·5 : 146°·3 : 41″·7 : gold, or y., bl. β, *comes* to 8·5 : 11 : 73°·7 : 9″.

Σ 2624. xx^{h} 0^{m}·5, N. 35° 48′ : 7·2, 7·8, 9·5 : 178°·8, 327°·4 : 2″ : 42″·4. Es., *comes* 13 : 170°·1 : 30″.

h. 1470. xx^{h} 0^{m}·8, N. 38° 6′ : ruddy y., contrasted green. Se., 7, 8 : 335°·2 : 23″·8 : pale clear r., intense bl. 'Colori superbi.' Ar. 7·2, 9·4 : B., 8, 10. Es., 7·2, 9 : 337°·5 : 29″·3 : '14.

Σ 2626. xx^{h} 1^{m}·0, N. 30° 19′ : 8, 8·2 : 121°·7 : 1″·2.

Σ 2639. xx^{h} 6^{m}·2, N. 35° 15′ : 7·7, 8·7 : 5″·6 : yw., ashy w. Beautiful.

Σ 2645. xx^{h} 7^{m}·3, N. 51° 26′ : 8, 8·3 : 136°·9 : 1″·5.

β 430. xx^{h} 8^{m}·6, N. 35° 35′ : De., 9·5, 10, 9·7 : 17°·7, 51°·3 : 1″·1, 16″·9.

Σ 2649. xx^{h} 9^{m}·1, N. 31° 50′ : 7·7, 8·8 : 152°·3 : 26″·1 : yw., ashy. Fr., '14 : 23″·3. p.m.

o (Σ I. 50). xx^{h} 11^{m}·1, N. 46° 30′ : 3·7, 5, 6·5 : 323°·7, 174° : 337″·8, 106″·8 : v. y., 2 blue. Sm. found the smaller stars cerul. bl. when the larger one was concealed ; Σ also called them bl. 'insignes,' '36. But I have noticed 5, w., $3\frac{7}{10}$-in. '50 ; w., or ysh., 'with an eye of bl.,' $5\frac{1}{2}$-in. '65 ; pale y., with a cast of bl., 'a strange but accurate description' ; same cols., $9\frac{1}{3}$-in. spec., '67, '69. Sa., same cols. There is a *comes*. β, 13 : 331°·7 : 36″·8. β adds fainter one : 169°·6 : 43″·2, nearly between 3·7 and 6·5, and sees 3 others to 6·5. Es., *comes* to 5, 13·1 : 250°·7 : 34″·6.

Σ 2658. xx^h 11^m·5, N. 52° 52′: 7, 9·1, 10·2: 126°·9, 216°·8: 5″·5, 32″·1: yw., bl., o. Es., '10: 115°·7, 210°·2: 5″·7, 45″·2, *comes* to 9·1, 14: 83°·4, 11″·2.

A 283. xx^h 12^m·3, N. 33° 39′: 6, 14: 295°·9: 2″·5.

Ho. 588. xx^h 13^m·7, N. 31° 15′: 6·5, 8·3: 298°·7: 51″: 8·3, *comes*, 12: 15°: 8″·2.

Σ 2663. xx^h 13^m·9, N. 39° 27′: 8, 8·5: 324°·9: 5″·3.

β 661. xx^h 14^m·1, N. 40° 7′: 6·2, 12·5: 67°: 12″·6.

β 441. xx^h 14^m·4, N. 28° 53′: 6·2, 11·5: 65°·7: 5″·7.

Σ 2667. xx^h 14^m·9, N. 45° 23′: 8·2, 8·5: 225°·7: 8″·1.

Σ 2666. xx^h 15^m·3, N. 40° 28′: 6·5, 8·7: 242°: 2″·7: v.w., blsh. Several faint dist. *comites*.

Σ 2671. xx^h 16^m·4, N. 55° 8′: 6, 7·4: 341°·1: 3″: w., ash. Fr., tawny, '76. A pretty pair.

Σ 2668. xx^h 17^m·3, N. 39° 9′: 7, 9·2: 293°·6: 3″·3: yw. ash. A. divides 7, 9: 111°·9: 0″·2.

β 663. xx^h 18^m·2, N. 53° 21′: 6·3, 15·2, 12·5: 313°·6, 75°·2: 7″·6, 7″·7.

A. C. 17. xx^h 18^m·3, N. 51° 12′: 6, 11½: 80°·2: 3″·8.

γ Cygni. xx^h 19^m·3, N. 40° 0′: 3 m^s., *β*, dist. *comes* (196°: 141″) double, 10·4, 10·4: 302°: 1″·8. Es., a red III type, 12′ *n*, var. ? Brilliant field *f*, and splendid sweeping *s*, especially between 36° and 37°.

O*ΣΣ* 207. xx^h 20^m·2, N. 42° 43′: De., 6·5, 7·7: 63°·1: 96″·4. Fr., '13: 93″·5. Ho. divides 6·5, 11: 34°·6: 0″·9.

Σ 2693. xx^h 26^m·3, N. 54° 14′: 8, 9: 13°·7: 13″·6.

Σ 2691. xx^h 26^m·7, N. 37° 51′: 8, 8·2: 32°·8: 17″·1. A fine pair.

44 (A. C. 18). xx^h 27^m·9, N. 36° 40′: 6·5, 11·5: 155°·3: 2″·6.

ω^3 (H*h*. 694). xx^h 28^m·8, N. 48° 57′: *β*, 5½, 10: 86°·3: 56″·3, *β* adds *comes*, 13·5: 342°·5: 17″·3. H*h*. 693 (*Σ* 6·5, 8·5) w., bl., '50; Sa., bl., mauve; *p* (Es.: 278°·1:

60″·4, *comes*, 13·5 : 121°·2 : 21″·4), makes with it a fine group. Two stars, which my $3\frac{7}{10}$-in. would just reach, but which are said to have been seen with 3-in., form a trapezium with ω^3. ω^3, deep y., '50.

β 434. xx^h 29^m·5, N. 41° 36′ : De., 9·1, 9·8 : 101°·1 : 1″·4.

Σ 2700. xx^h 31^m·5, N. 32° 14′ : 6·5, 8·3 : 286°·2 : 24″ : y., v.bl.

Σ 2702. xx^h 32^m·5, N. 34° 53′ : 8·5, 8·7 : 205°·8 : 3″·3.

48 (Σ I 53). xx^h 34^m·3, N. 31° 17′ : 6, 6·1 : 174°·8 : 178″·1 : (β, 180″ : '04). W., yw. 8, 8·25, '77. In splendid region. 50′ *n* two similar but smaller pairs.

Σ 2705. xx^h 34^m·5, N. 33° 5′ : 7·1, 8·1 : 262°·0 : 3″ : y., bl. Curious rhombus *p*.

Σ 2707. xx^h 35^m·3, N. 47° 39′ : 7·1, 8·6, 7·9 : 31°·7, 196° : 23″, 55″·4. Es. *comes* to 7·1, 13·5 : 191°·2 : 16″·3.

Σ 2708. xx^h 35^m·6, N. 38° 21′ : 7, 8·7 : 351°·7 : 11″·3 : y., bl. '32. β, '01 : 330° : 20″·3. Ha., *comes* 15 : β, 27°·6 : 20″·3. 8, 9 : '79. Fr., scarcely 1 m^g. diff. '76. p.m.

Espin 89. xx^h 35^m·7, N. 47° 47′ : 6·5, 11·2 : 199°·1 : 16″·5.

Σ 2711. xx^h 36^m·3, N. 30° 13′ : 8, 9 : 222°·5 : 2″·5.

Ho. 137. xx^h 37^m·3, N. 29° 31′ : 6·5, 11 : 278°·9 : 1″·2.

OΣ 410. xx^h 37^m·6, N. 40° 18′ : 6·4, 6·7, 7·7 : 31°·2, 69°·8 : 0″·7, 69″. (Bryant, '11 : 17°·8 : 0″·7), two v.y., gold, 18^m *f*, 18′ *n* γ.

49 (Σ 2716). xx^h 37^m·8, N. 32° 1′ : 6, 8·1 : 49°·4 : 2″·7 : y., bl.

α (H*h*. 702). xx^h 38^m·7, N. 45° 0′ : 1, 12 : Es., 105°·5 : 75″·4. Fixed. Pair, 1^m *f*, 4′ *n*, 9·3, 9·9 : 291°·2 : 6″·1.

51 (β 675). xx^h 40^m·1, N. 50° 2′ : 6, 12·5 : 101°·5 : 2″·8. Two 12 m^g. *comites*, 182°·4, 328°·4 : 25″·4, 32″·8.

52 (Σ 2726). xx^h 42^m·4, N. 30° 26′: 4, 9·2: 57°·2: 6″·6: v. y., o. Y., bl., '50. Fr., '15: 65°·6: 6″. 4^m 55^s *f*, 10′ *n* is β 67: De., 6·9, 10·2: 287°·1: 1″·5.

λ (OΣ 413). xx^h 44^m·3, N. 36° 12′: 5, 6·3: 82°·1: 0″·7. Ph., '14: 52°·7.

OΣ 414. xx^h 44^m·3, N. 42° 7′: 7·2, 8·3: 95°·9: 9″·9.

Espin 810. xx^h 44^m·5, N. 47° 29′: 5·5, 14·5: 42°·1: 18″·3.

Espin 93. xx^h 45^m·5, N. 52° 7′: 6, 11: 273°: 7″·4.

Espin 31. xx^h 46^m·1, N. 32° 57′: 8·7, 9, 10: 245°·6, 141°·1: 9″·6, 17″·9. Very r., two bl.

Σ 2732. xx^h 46^m·3, N. 51° 36′: 6·7, 8·7: 73°·8: 4″.

Espin 94. xx^h 47^m·1, N. 49° 50′: 6·5, *comes*: 13°·1: 103″, double, 9·5, 10: 80°: 2″·4.

β 155. xx^h 48^m·6, N. 51° 7′: 6·5, 7·4: Doo., 27°·3: 0″·8. *Comes*, 25°·5: 17″·7.

OΣ 416. xx^h 49^m·1, N. 43° 25′: 7·8, 8·1: 141°·3: 7″·3. Fr., '15: 130°·9: 7″·7.

OΣ 418. xx^h 51^m·5, N. 32° 24′: 7·3, 7·4: 293°: 1″: rsh., w.

β 1137. xx^h 53^m·8, N. 50° 25′: 6, 13·7: 344°·3: 6″·9.

Σ 2741. xx^h 55^m·9, N. 50° 9′: 6, 7·3: 35°·8: 1″·9.

59 (Σ 2743). xx^h 57^m·1, N. 47° 12′: 4·7, 9: 352°·4: 20″·2. h. *comes*, 11·5: β, 140°·6: 26″·7. Es., another, 221°: 38″·3. 4·7 has bright hydrogen lines, possibly var.

60 (OΣ 426). xx^h 58^m·4, N. 45° 51′: 5·8, 10: 166°·1: 2″·7.

Σ 2747. xx^h 59^m·2, N. 37° 20′: 8·2, 8·2: 257°·4: 4″·5.

Σ 2748 rej. xx^h 59^m·3, N. 39° 11′: β, 6, 10: 299°·9: 18″·7, with 12 m^g: 249°·8: 26″·1. Wa., several *comites*. Orange, bl., '50.

61 (Σ 2758). xxi^h 3^m·3, N. 38° 21′: 5·3, 5·9: 89°·4: 15″·3. Y., or gold, '28. Fr., '13: 129°·2: 23″·5. *s* 61, is a purple star 10·5 m^g. One of the most

interesting objects in the sky. These suns were the first of the host of heaven to reveal to Bessel ('38) the secret of their distance.[1] This is probably 366,400 times that of the Earth from the Sun—itself 92,400,000 miles—a space so vast that light, which reaches from the Sun in 8^m, employs nearly 6 years to traverse it : we see these stars, therefore, not as they are now—for of their present existence we have no information—but as they were 6 years ago.[2] β has shown that the motion of the two stars is rectilinear, one having an annual motion of $5''{\cdot}196$ towards $51^\circ{\cdot}5$, the other of $5''{\cdot}113$ towards $53^\circ{\cdot}5$. Lewis thinks, however, that the motion is not strictly rectilinear, and Adams finds that the motion in the line of sight is 62 K and 63 K respectively.

How vast must be the dimensions of this great Universe ! What a temple for the Creator's glory ! 'All the whole heavens are the Lord's,' those heavens are crowded with millions upon millions of stars ; and of all that countless multitude, millions, probably, for one, are at a distance incalculably exceeding that of 61 Cygni!

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[1] Bessel's grand result was obtained with the Königsberg Heliometer. The instrument, absurdly so termed, as if it were intended to measure the *Sun*, has an object glass cut into two halves ; a slight displacement of these, by producing a double image, affords the means of accurate measurement. There is a fine heliometer at Oxford, 7½-in. aperture.

[2] From the successive transmission of light results the extraordinary fact that the aspect of the whole heavens is of unequal date, each star having its own time of 'light-passage' to our eyes, and those times immensely differing, so that there is no impossibility in Humboldt's magnificent assertion, 'much has long ceased to exist before the knowledge of its presence reaches us ; much has been otherwise arranged.' As Huggins remarks, the outburst of T Coronæ may have occurred many years ago.

Σ 2760. xxi$^{\text{h}}$ 3$^{\text{m}}$·5, N. 33° 49′: 7·3, 8·1: 223°·3: 13″·3: ysh. w., ashy. β, '05: 227°·2: 5″·7.

63 (Espin 32). xxi$^{\text{h}}$ 3$^{\text{m}}$·8, N. 47° 20′: 4, 11·7: 154°: 15″·7. 4, orange, II type. In field, 5′ *n*, closely *sp* a 9·5 m$^{\text{g}}$., a gas. neb. found by Copeland, and independently by β. Visually double, 6″ apart, in two elongated masses, but photos show complicated plan. neb. with central star. 4$^{\text{m}}$ *f* 63 is a fine wide pair, OΣΣ 215, *s* star red, type III; *n* star β 159: 6·1, 9·2: 318°·4: 1″·3. Glorious fields near 63.

Σ 2762. xxi$^{\text{h}}$ 5$^{\text{m}}$·2, N. 29° 53′: 6, 8: 315°·6: 3″·5: grnsh. w., blsh. Yw., ruddy, '50. Dist., 9·2.

Σ 2773. xxi$^{\text{h}}$ 7$^{\text{m}}$·3, N. 43° 40′: 8·2, 9: 118°·4: 3″·3. β, *comes*, 13: 63°·5: 22″·1; Es., another, 14: 261°·3: 29″·6. 104″ *p* is h. 1618: 8·2, 11: β, 167°·9: 21″·7; '79. Es., 173°: 19″·9; '15. β doubled *comes*, 11·5, 12: 132°·6: 2″·9. Star, 11·5 between the two groups. An excellent test field (see diagram, p. 108). 5$^{\text{m}}$ *f* ξ, a fine orange star.

OΣ 431. xxi$^{\text{h}}$ 8$^{\text{m}}$·5, N. 40° 55′: 7·6, 8: 117°·3: 3″·2.

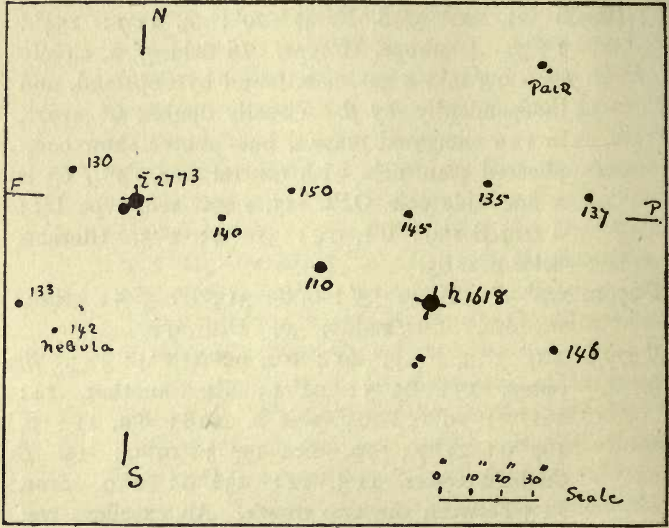
Σ 2779. xxi$^{\text{h}}$ 11$^{\text{m}}$·0, N. 28° 45′: 8·5, 8·5: 189°·4: 19″·2: ysh. Fr., '14: 179°·6: 16″·5.

OΣ 432. xxi$^{\text{h}}$ 11$^{\text{m}}$·2, N. 40° 49′: 6·8, 7·2: 130°·4: 1″·2: gold.

τ (A.G.C. 13). xxi$^{\text{h}}$ 11$^{\text{m}}$·6, N. 37° 42′: De., 4·5, 7·5: 174°·8: 1″·1: w.y., azure, '74. A., '06: 259°·9: 0″·7. Bin. Holden, *comes* 13.

υ (h. 932). xxi$^{\text{h}}$ 14$^{\text{m}}$·6, N. 34° 34′: OΣ, 4·6, 10·2, 10·2: 219°·5, 177°·8: 14″·8, 21″·4. 4·6, hydrogen lines bright. Har.

Ho. 601. xxi^{h} 15^{m}·8, N. 40° 41′ : 6·5, 13 : 180°·7 : 17″·1.
Ho. 286. xxi^{h} 16^{m}·2, N. 37° 51′ : 6, 6 : Doo., 258°·1 : 0″·2.
Bryant, '12 : 6°·8.


N
Pair
130
Σ 2773
F
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137
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140
145
110
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142
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Scale

Σ 2773 and h. 1618.

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Espin 98. xxi^{h} 16^{m}·8, N. 51° 59′ : 6·5, two 10 m^{s}. *comites*, the furthest double (β, 9·9, 14·2 : 261°·5 : 7″·3).
OΣ 437. xxi^{h} 17^{m}·5, N. 32° 7′ : 6·5, 7·2 : 57°·8 : 1″·5 : y. Greenw., '12 : 40°·2 : 1″·9.
Σ 2789. xxi^{h} 17^{m}·5, N. 52° 38′ : 7·1, 7·1 : 116°·4 : 5″·9 : w., ysh.
Espin. xxi^{h} 22^{m}·1, N. 48° 59′ : 6·5, 12 : 161°·5 : 19″·2.
Σ 2803. xxi^{h} 27^{m}·2, N. 52° 34′ : 7·4, 9 : 290°·2 : 23″·2.
Σ 2802. xxi^{h} 28^{m}·4, N. 33° 27′ : 8, 8 : 11°·3 : 3″·8.

OΣ 447. xxi^{h} 36^{m}·3, N. 41° 23′ : 7, 7·9, 11·1 : 45°·3, 169°·4 : 29″, 14″ : y., ysh., o. β, two *comites*, 12·7, 12·1 : Hu., 14°·5, 247°·2 : 6″·1, 17″·4.

A. 1445. xxi^{h} 36^{m}·6, N. 39° 9′ : 6·5, 12·5 : 280°·3 : 1″·5.

75 (A. C. 20). xxi^{h} 37^{m}·0, N. 42° 55′ : De., 5·2, 10·5 : 322°·3 : 2″·7. Distant 9·4. 32^{s} *p*, Da. 14 : 8·2, 10·7 : 351°·3 : 3″·6.—1^{m} 42^{s} *p* 75, Da. 15 : 7·2, 10·1 : 72°·2 : 1″·3.

μ (Σ 2822). xxi^{h} 40^{m}·5, N. 28° 23′ : 4, 5 : 114°·5 : 5″·6 : w., blsh w. Greenw., '12 : 128°·2 : 1″·8. Dist., 6·2. Y., tawny or bl., 6·2 lilac, '51. Cols. var. ? Fr., several minute stars between 6·2 and close pair.

Σ 2832. xxi^{h} 46^{m}·3, N. 50° 8′ : 7·8, 8·3 : 213°·6 : 13″·1 : v. w. Pale y., grey. 12 m^{g}. *comes np*, '73.

OΣ 456. xxi^{h} 52^{m}·6, N. 52° 9′ : 7·8, 8 : 25°·7 : 1″·3.

Σ 2852. xxi^{h} 57^{m}·7, N. 53° 47′ : 9, 9 : 171°·9 : 7″·7.

Stars with Remarkable Spectra, and Variables.

Es.-Birm. 600. xix^{h} 22^{m}·4, N. 50° 4′ : 7·5 : R. : III : Es.

AF (var.). xix^{h} 26^{m}·4, N. 45° 52′ : 8·6 : IV : Es.

UV (var.). xix^{h} 28^{m}·5, N. 43° 28′ : 7–9 : ? : Deichmüller.

R (var.). xix^{h} 34^{m}·7, N. 50° 1′ : 6·6–13·9 : 425^{d}·9 : Pogson. Spectrum var. F. very bright at max.

TT (var.). xix^{h} 37^{m}·9, N. 32° 26′ : 8 : IV.

RT (var.). xix^{h} 41^{m}·4, N. 48° 35′ : 6·7–12 : 190^{d}·5 : Har.

SU (var.). xix^{h} 41^{m}·6, N. 29° 4′ : 6·2–7 : 3^{d}·844 : Müller and Kempf.

χ^2 (var.). xix^{h} 47^{m}·5, N. 32° 43′ : 4–13·5 : 406^{d} : Kirch.

Var. xix^{h} 54^{m}·6, N. 44° 2′ : 8·2 : IV : Du. Var., Es.

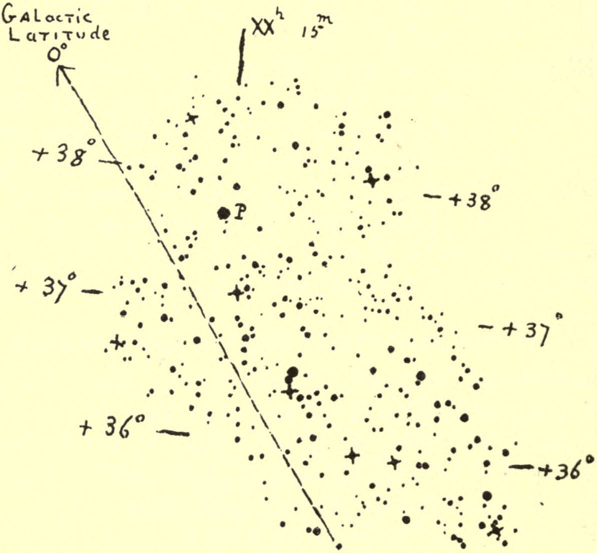
Z (var.). xix^{h} 59^{m}·2, N. 49° 49′ : 7–13 : 263^{d} : Es.

Type V. xx^{h} 2^{m}·9, N. 35° 26′ : 7 : Har.

S (var.). xx^{h} 3^{m}·8, N. 57° 45′ : 9·2<14·7 : 323^{d} : Bonn.

Type V. xx^{h} 7^{m}·2, N. 35° 56′ : 7·8 : Wolf-Rayet.

SV (var.). xx^h 7^m·3, N. 47° 37′ : 9·3 : ? : IV : Es.
RY (var.). xx^h 7^m·4, N. 35° 42′ : 8·5–10 : IV : Es.
RX (var.). xx^h 8^m·4, N. 47° 34′ : 7·5–8·3 : Deichmüller.
Type V. xx^h 8^m·8, N. 35° 57′ : 7·9 : Wolf-Rayet.
Type V. xx^h 9^m·3, N. 38° 7′ : 7·4 : Copeland.
RS (var.). xx^h 10^m·5, N. 38° 29′ : 6·7–8·4 : Es. IV.



TRACING FROM ARGELANDER SHOWING STARS OF TYPE V (MARKED THUS +) NEAR P CYGNI.

Type V. xx^h 11^m·5, N. 36° 25′ : 7·9 : Wolf-Rayet. 3rd of a beautiful bright semicircle, an orange star *n*.
Es.-Birm. 659*a*. xx^h 13^m·8, N. 49° 41′ : 9–10. Var. : IV : Es.
Type V. xx^h 14^m·0, N. 37° 11′ : 8 : Har.
P (Nova ?). xx^h 14^m·8, N. 37° 47′ : 3·5–6 : Jansen. No change since 1670. Hydrogen and Helium lines

dark with bright lines on the edge of greater wave length (Har.). 'In most cases the degree of absorption of the dark line is approximately proportional to the intensity of the bright line' (Merrill).

WX (var.). xx^{h} 15^{m}·6, N. 37° 8′ : Wolf. IV : Es.

Type V. xx^{h} 16^{m}·6, N. 38° 29′ : 8 : Har.

U (var.). xx^{h} 17^{m}·1, N. 47° 38′ : 6·7–10·8 : 461^{d}·3 : Knott. (see under 32 *infra*).

Type V. xx^{h} 17^{m}·7, N. 43° 36′ : 6·8 : Har.

Es. 458. xx^{h} 18^{m}·1, N. 35° 21′ : 9·5 : IV : Es.

Es.-Birm. 664. xx^{h} 18^{m}·4, N. 36° 40′ : 9·5 : W. : IV.

Type V. xx^{h} 18^{m}·5, N. 36° 40′ : 9·5 : Har.

Es.-Birm. 665. xx^{h} 18^{m}·7, N. 37° 17′ : 9·4 : IV : Es.

RW (var.). xx^{h} 25^{m}·9, N. 39° 43′ : 8–9·5 : IV : Es.

SZ (var.). xx^{h} 30^{m}·2, N. 46° 20′ : 8–10 : 15^{d}·084 : Williams.

V (var.). xx^{h} 38^{m}·7, N. 47° 51′ : 8·3–13·5 : 418^{d} : B. IV.

X (var.). xx^{h} 39^{m}·5, N. 35° 14′ : 6–7 : 16^{d}·395 : Chandler.

RR (var.). xx^{h} 43^{m}·3, N. 44° 35′ : 8·1–9·7 : III : Es.

T (var.). xx^{h} 44^{m}·0, N. 34° 5′ : 5·5–6 : Schmidt.

Es.-Birm. 688. xx^{h} 44^{m}·1, N. 45° 45′ : 8·8 : IV ? : Es.

Y (var.). xx^{h} 48^{m}·1, N. 34° 17′ : 7·1–7·9 : 1^{d}·5 : Chandler.

υ. xxi^{h} 13^{m}·8, N. 34° 28′ : 4·4 : Hy. : Har.

YY (var.). xxi^{h} 19^{m}·4, N. 42° 3′ : 8·7–9·3 : Deichmüller. IV.

W (var.). xxi^{h} 33^{m}·0, N. 45° 1′ : 5–6·7 : 131^{d}·5 : Gore. III. *s* of ρ. There is also an orange star *n* of ρ.

RU (var.). xxi^{h} 37^{m}·9, N. 53° 57′ : 7·5–10 : 436^{d} : Es.

Nova. xxi^{h} 38^{m}·6, N. 42° 28′ : 3 : Nov. 24, '76, Schmidt; faded to 14·5 and so remains. The Nova appeared hazy in 1911 to Barnard with the 40-in. Yerkes, and has a focus slightly greater than an ordinary star. Barnard has done most valuable work in comparing the foci of several of the novæ with neighbouring stars. It appears that in each case a nova becomes a planetary neb., and finally a V-type star.

Es.-Birm. 711. xxi^{h} 38^{m}·6, N. 35° 8′ : 6·2 : IV : D'A.

SS (var.). xxi^{h} 39^{m}·6, N. 43° 13′ : 8·4–12 : Wells. Spect. var. Hydrogen lines sometimes bright. Two spectra superimposed. The star resembles U Geminorum, in rushing up to a max. Two-thirds of the time its mag. is 11·8, about once in fifty days the light suddenly increases to 8·3, then gradually falls to 11·8. The maxima are alternately long and short (Leon Campbell).

RV (var.). xxi^{h} 40^{m}·0, N. 37° 39′ : 7·1–9·3 : Safarik. IV.

Clusters and Nebulæ.

6826 (H. IV 73). xix^{h} 42^{m}·7, N. 50° 19′. Plan. Gaseous neb., mag. 8·3, diam. some 20″, with 11 mag. in centre. 2^{m} 52^{s} *f* 16.

6866 (H. VII 59). xx^{h} 1^{m}·1, N. 43° 46′. Fine cl.

Glorious sweeping along 35° 30′ culminating about 27 : xx^{h} 2^{m}·9, N. 35° 34′. Fr., fine trapezium $\frac{1}{4}$° *s* of 27 : brightest beautiful double.

32. xx^{h} 13^{m}·0, N. 47° 28′ : 5 : dull or. Marks a fine field. 4·2^{m} *f*, 11′ *n*, is U Cygni with 8·0 *comes* blue, B. (Es., yw., 52°·3 : 62″·7. 1^{m} 51^{s} *p*, 14′ *s*, is a pretty pair, h. 1510 : 9·7, 10 : 334°·2 : 5″.)

6910 (H. VIII 56). xx^{h} 20^{m}·2, N. 40° 31′. Beautiful group. h., 10–12. $\frac{1}{2}$° *n* of γ, a little *f*.

6940 (H. VII 8). xx^{h} 31^{m}·2, N. 28° 2′. Field of minute stars.

6960 (H. V 15). xx^{h} 42^{m}·4, N. 30° 26′. Nebulous ray extending *n* and *s* of 52.

6992 (H. V 14). xx^{h} 53^{m}·1, N. 31° 23′. Large nebulosity in a curve. Wolf's photos show that this and 6960 are probably one large nebula.

ξ. xxi^{h} 2^{m}·0, N. 43° 36′. Great neb. found by Wolf on photos; sharply defined *s*, and containing a dark opening like a cross. Visible as a glow in a field glass, but brightest part scarcely visible in 17¼-in. reflector. Es.

7027 (Stephan.). xxi^{h} 4^{m}·0, N. 41° 55′. Planetary, like an 8·5 star, about 4″, found by me independently, Nov. 14, '79.

Curious horseshoe, and magnificent Galaxy field. xxi^{h} 5^{m}·5, N. 46° 55′·8. Es.

7092 (M. 39). xxi^{h} 29^{m}·4, N. 48° 5′. Grand open cluster.

I had at one time projected a survey of the wonders of this region with a sweeping power; but want of leisure, an unsuitable mounting, and the astonishing profusion of magnificence, combined to render a task hopeless for me which, I trust, may be carried through by some future observer.

DELPHINUS.

The leaders of this little, compact, fish-like constellation, α and β, are distinguished by names which, even among the multifarious disfigurements of Oriental words, so abundant in the heavens, are pre-eminently strange—*Svalocin* and *Rotanev*. The former Sm. has justly characterized as 'cacophonous and barbaric,' and says that 'no poring into the black-letter versions of the Almagest, El Battáni, Ibn Yúnis, and other authorities, enables one to form any rational conjecture as to the misreading, miswriting, or misapplication, in which so strange a metamorphosis could have originated.' And of *Rotanev* he observes, 'That which putteth derivation and etymology at defiance.' Where so eminent and accomplished a scholar and antiquarian did not succeed it would seem presumptuous to offer a solution, but that accident is sometimes more fortunate than study; and if the following is not after all the right key, it certainly is a marvel that it should open the lock so readily. The letters of these strange words reversed form NICOLAUS VENATOR, a Latin version of the name of NICCOLO CACCIATORE, assistant at the Palermo Observatory, in the catalogue emanating from which these stars are so denominated.[1] A very fine region for sweeping.

DOUBLE STARS.

Σ 2665. xx^{h} 15^{m}·6, N. 14° 7′ : 6·5, 9·2 : 17°·2 : 3″·1. A. doubles *comes:* 9·5, 10·8 : 266°·5 : 0″·2.

Σ 2664. xx^{h} 15^{m}·9, N. 12° 45′ : 7·7, 8·2 : 322°·6 : 27″·7.

Σ 2680. xx^{h} 21^{m}·1, N. 14° 37′ : 8·3, 8·5 : 289° : 15″·8.

1 (*β* 63). xx^{h} 26^{m}·5, N. 10° 38′ : De., 6, 8·1 : 343°·3 : 0″·8; *comes*, 14·2 : 346°·6 : 17″·8.

Σ 2690. xx^{h} 27^{m}·4, N. 10° 59′ : 7, 7·2 : 256°·3 : 14″·2 : Chapman, '11 : 15″·9. D. doubled 7·2, 9 : Bies., '03 : 213°·8 : 0″·5. *Comes, β*, 12 : 105°·7 : 23″·5, makes up a difficult quadruple group.

Σ 2696. xx^{h} 29^{m}·6, N. 5° 10′ : 8, 8·4 : 298°·9 : 1″·1. *β*, '01 : 306°·5, *comes* 14 : 348°·7 : 13″·8.

Σ 2701. xx^{h} 33^{m}·1, N. 11° 46′ : 7·8, 8·2 : 218°·8 : 2″·1.

Σ 2703. xx^{h} 33^{m}·5, N. 14° 27′ : 7·6, 7·6 : 291°·2 : 25″·1. dist., 7·6.

β (*β* 151). xx^{h} 33^{m}·8, N. 14° 19′ : 4, 6. Bin. 26·79 years. A., '12 : 228°·6 : 0″·2. Greatest dist., 0″·6 at

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[1] Cacciatore died in 1841, from the effects of cholera.

356°, least 0″·2 at 90°. Max. dist. 1924 ±. Two dist. *comites*. β and ζ two fine y. stars.

θ. xx^{h} 35^{m}·0, N. 13° 4′ : is in a beautiful field.

κ (OΣ 533). xx^{h} 35^{m}·2, N. 9° 48′ : 4·7, 11·3 : 13°·3 : 10″·3 : β, ’04 : 302°·4 : 16″·4. p.m.

α. xx^{h} 35^{m}·9, N. 15° 37′ : wide pair, pale y., pale bl. β and Sa., several *comites*. 33 sec. *p*, 4′ *s* is β 288 : 6·2, 13·2 : 162° : 7″·7.

Σ 2713. xx^{h} 37^{m}·1, N. 10° 17′ : 9, 9 : 64°·1 : 4″·8.

Σ 2718. xx^{h} 38^{m}·8, N. 12° 26′ : 7·4, 7·6 : 86°·6 : 8″·3.

Σ 2720. xx^{h} 39^{m}·8, N. 16° 39′ : 8·5, 8·7 : 185° : 3″·8.

Σ 2722. xx^{h} 40^{m}·0, N. 19° 27′ : 8·2, 8·7 : 308° : 7″·1 : yw., ash.

Σ 2723. xx^{h} 41^{m}·1, N. 12° 2′ : 6·4, 8·2 : 85°·6 : 1″·5. Bowyer, ’03 : 99°·6. β, 2 *comites*.

Σ 2725. xx^{h} 42^{m}·5, N. 15° 37′ : 7·3, 8 : 358° : 4″·2 : w., ashy. Fr., y., bl., ’76. Seabroke, ’01 : 364°·1 : 5″·4. p.m.

γ (Σ 2727). xx^{h} 43^{m}·0, N. 15° 51′ : 4, 5 : 273°·8 : 11″·9 : gold, blsh. grn. Y., pale grn., ’55, ’57. H., w., 1779. h., and S., w., ysh., ’24. Gore, rsh. y., greysh. lilac, ’74. Fr., golden y., grnsh. bl., ’14. c.p.m.

13 (β 65). xx^{h} 45^{m}·8, N. 5° 43′ : De., 5·2, 8·9 : 186°·8 : 1″·6 : w., olive.

Σ 2730. xx^{h} 47^{m}·1, N. 6° 5′ : 7·8, 7·9 : 339°·2 : 3″·4.

Σ 2734. xx^{h} 50^{m}·2, N. 12° 48′ : 8·2, 8·7 : 181°·7 : 28″·5. β, ’05 : 198°·2 : 24″·8.

Σ 2736. xx^{h} 52^{m}·9, N. 12° 41′ : 7·5, 8·7 : 218°·5 : 5″·1.

Σ 2738. xx^{h} 54^{m}·8, N. 16° 7′ : 7·2, 8·2 : 254°·4 : 14″·7.

Σ 2739. xx^{h} 56^{m}·2, N. 19° 45′ : 8·3, 8·8 : 252°·1 : 3″·2.

Σ 2754. xxi^{h} 2^{m}·4, N. 12° 52′ : 8, 8·7 : 303°·2 : 34″·6. Bryant, ’05 : 32″·7.

Stars with Remarkable Spectra, and Variables.

R (var.). xx^{h} 11^{m}·0, N. 8° 51′ : 7·6–13 : 284^{d}·4 : Hencke.

Es.-Birm. 672. xx^{h} 25^{m}·5, N. 15° 56′ : 8·3 : R., blue near. W. III.

Es.-Birm. 679. xx^{h} 34^{m}·3, N. 17° 59′ : 7 : Yr. : III. D'A. 14 sec. *p*, 1′ *n* is W (var.) : 9·4–12·1 : 4^{d}·8 : Algol type. Wells.

S (var.). xx^{h} 39^{m}·4, N. 16° 48′ : 8·4–12 : 277^{d}·5 : Baxendell, an 8·5 near, same col.

T (var.). xx^{h} 41^{m}·6, N. 16° 6′ : 8·2$<$13 : 331^{d}·2 : Baxendell.

U (var.). xx^{h} 41^{m}·8, N. 17° 48′ : 6·4–7·3 : Irr. : D'A. Fine III : a 9 m^{g}. 18 sec. *p*, 10′ *n*, same col. Es.

V (var.). xx^{h} 44^{m}·1, N. 19° 2′ : 7·5$<$17 : 532^{d} : Fleming.

X (var.). xx^{h} 51^{m}·2, N. 17° 21′ : 8–13 : 277^{d} : Anderson.

Nebulæ.

6905 (H. IV 16). xx^{h} 18^{m}·8, N. 19° 51′. Small, faint, misty, ill-defined, closely surrounded by several small stars. E. of R., spiral.

6934 (H. I 103). xx^{h} 30^{m}·3, N. 7° 8′. H., bright, large, resolved, 16–20 m^{g}. D'A., easy.

DRACO.

A long, winding constellation, always above the horizon ; in consequence of which its stars, like all others in the Arctic Circle, appear at different times *entirely reversed* in relative position. A careful attention to *p* and *f*, that is, to the direction of apparent motion through the field, is in these cases required, to ensure identification. Here are many fine pairs.

DOUBLE STARS.

Σ 1304. IX^{h} 9^{m}·5, N. 81° 44′ : 8·2, 9 : 317° : 24″·1.

Σ 1326. IX^{h} 16^{m}·8, N. 78° 47′ : 7·7, 8·1 : 171°·4 : 29″.

Σ 1516. XI^{h} 10^{m}·0, N. 73° 55′ : 7, 7·5 : 298°·7 : 9″·9 : ysh., ashy y., '31. β, '05 : 99°·1 : 22″, from p.m. OΣ, *comes*, 10·2 ; β, '05 : 302°·3 : 7″·3, moving with 7.

Σ 1573. XI^{h} 44^{m}·9, N. 67° 46′ : 6·6, 7·6 : 177°·9 : 11″·1 : w. Fr., w., blsh.

β 794. XI^{h} 49^{m}·3, N. 74° 13′ : 6·5, 7·8 : 106°·6 : 0″·4 ; '81. A., '11 : 277°·2 : 0″·1 : Bin., 42 years. *Comites :* 13·7, 13 : 71°·8, 78°·6 : 5″·7, 26″·7.

Σ 1588. XI^{h} 58^{m}·2, N. 72° 48′ : 8·5, 8·7 : 60°·7 : 16″·5. Fr., '15 : 50°·9 : 14″·6. p.m.

Σ 1602. XII^{h} 3^{m}·3, N. 69° 31′ : 7·5, 9 : 179°·8 : 13″. β, '04 : 16″·1. 1^{m} *p*, 24′ *s* is Σ 3123 : 7, 7 : 289°·7 : 0″·3, '32. A., '11 : 164°·8 : 0″·3. Bin. Barnard, *comes :* 15·7 : 310°·6 : 3″·1.

Σ 1654. XII^{h} 28^{m}·8, N. 75° 16′ : 7·3, 8·8 : 26° : 3″·7 : y., bl.

Σ 1658. XII^{h} 52^{m}·3, N. 75° 4′ : 8·2, 8·7 : 109°·5 : 10″·3.

OΣΣ 123. XIII^{h} 24^{m}·4, N. 65° 10′ : De., 6·4, 6·8 : 147°·1 : 68″·9 : w., yw. Ysh., bl. Striking object. c.p.m.

Σ 1767. XIII^{h} 31^{m}·8, N. 68° 8′ : 8, 8·5 : 353°·8 : 4″·7.

Σ 1827. XIV^{h} 11^{m}·8, N. 59° 37′ : 8·5, 9 : 210°·9 : 11″·2.

Σ 1831. XIV^{h} 13^{m}·6, N. 57° 5′ : 6·3, 9 : 142°·8 : 6″ : v. w., ash. *p* is Σ 1830 : 8·5, 9·8 : 264° : 4″·8 : ysh., o. Storey, '09 : 294°·5 : 7″·2, faint star, 36″ *f*.

Σ 1860. XIV^{h} 31^{m}·4, N. 55° 35′ : 7·5, 8·7 : 101°·2 : 1″·2 : v. w., ashy w.

Σ 1872. XIV^{h} 38^{m}·7, N. 58° 19′ : 7, 8 : 38°·4 : 7″·5 : ysh., ashy w. c.p.m.

Σ 1882. XIV^{h} 42^{m}·1, N. 61° 26′ : 7·2, 8·7 : 2°·5 : 11″·5 : yw., ash.

Σ 1918 rej. XV^{h} 6^{m}·3, N. 63° 25′ : 6, 10 : β, 21° : 17″·8.

Σ 1927. xv^{h} 10^{m}·3, N. 62° 9′ : 7·1, 8 : 353°·9 : 16″·1.

Σ 1948. xv^{h} 24^{m}·5, N. 55° 10′ : 8, 8·7 : 50°·5 : 12″·2. Fr., '15 : 48°·8 : 12″·9.

Σ 1969. xv^{h} 39^{m}·8, N. 60° 14′ : 8, 8·7 : 43°·4 : 1″·5. A., '11 : 56°·3 : 0″·6.

Σ 1976. xv^{h} 43^{m}·3, N. 59° 40′ : 8·2, 8·2 : 71°·8 : 18″·8. Fr., '15 : 19″·5.

β 946. xv^{h} 45^{m}·7, N. 55° 38′ : 5·2, 10·9 : 152° : 1″·3.

Σ 1984. xv^{h} 49^{m}·0, N. 53° 9′ : 6·2, 8·5 : 273°·8 : 6″·6 : w., o. Fr., '15, w., blsh.

Σ 1996. xv^{h} 54^{m}·8, N. 57° 31′ : 8·7, 9 : 109°·4 : 19″·2.

Σ 2006. xv^{h} 58^{m}·8, N. 59° 9′ : 7·5, 9·2, 7·7 : 204°·6, 223°·7 : 1″·6, 43″·5. Do., '03 : 193°·3, 218°·2 : 1″·5, 45″·2.

Σ 2045. xvi^{h} 19^{m}·2, N. 61° 41′ : 8, 9·2 : 183°·1 : 2″·5. 1^{m} 13^{s} *p*, 3′ *s* is β 41 : 9, 10·7 : 58°·9 : 2″·4.

η (OΣ 312). xvi^{h} 22^{m}·9, N. 61° 42′ : 2·1, 8·1 : 143°·1 : 4″·7 : y., o. c.p.m. 11′ *n* is Σ 2054 : 5·7, 6·9 : 7°·4 : 0″·9. Doo., '00 : 1°·6 : 1″·2.

Σ 2060. xvi^{h} 26^{m}·9, N. 56° 55′ : 9, 9 : 246°·2 : 3″·7.

17 (Σ 2078). xvi^{h} 34^{m}·3, N. 53° 5′ : 5, 6 : 116°·5 : 3″·7. A 5 m^{g}. : 14°·7 : 90″·4. W., pale lilac, w., '50. Fr., '15 : pale y., lilac.

Σ 2092. xvi^{h} 37^{m}·9, N. 60° 51′ : 7·7, 8·8 : 5°·9 : 8″.

Σ 2116. xvi^{h} 54^{m}·6, N. 63° 39′ : 8·2, 8·8 : 6° : 18″·9. Fr., '15 : 4°·3 : 19″·7.

20 (Σ 2118). xvi^{h} 56^{m}·0, N. 65° 9′ : 6·4, 6·9 : 246°·4 : 0″·8 : '32. Bryant, '12 : 84°·2 : 0″·4. Bin. ?

Σ 2124. xvi^{h} 59^{m}·0, N. 65° 19′ : 8·5, 9·2 : 88°·9 : 15″.

Σ 2128. xvii^{h} 2^{m}·3, N. 59° 41′ : 8, 9·2 : 57°·4 : 11″·6. Fr., '15 : 49°·6 : 12″·4.

μ (Σ 2130). xvii^{h} 3^{m}·7, N. 54° 35′ : 5, 5·1 : 205°·1 : 3″·2. Ph., '14 : 131°·9 : 2″·3. Bin. β, *comes* to 5·1 : 13 : 189°·7 : 12″·2, moving with it.

Σ 2138. xvii$^{\text{h}}$ 8$^{\text{m}}$·4, N. 54° 36′ : 8, 8·3 : 139°·2 : 22″·3. Fr., ’15 : 134°·8.

Σ 2155. xvii$^{\text{h}}$ 15$^{\text{m}}$·1, N. 60° 47′ : 6·2, 9·5 : 115°·5 : 9″·6.

Σ 2180. xvii$^{\text{h}}$ 27$^{\text{m}}$·0, N. 50° 56′ : 7, 7·2 : 265°·3 : 3″·2.

β (β 1090). xvii$^{\text{h}}$ 28$^{\text{m}}$·6, N. 52° 21′ : 3, 14 : 13°·4 : 4″.

ν (Σ I 35). xvii$^{\text{h}}$ 30$^{\text{m}}$·6, N. 55° 14′ : 4·6, 4·6 : 313° : 61″·7 : yw. A grand object. c.p.m.

26 (β 962). xvii$^{\text{h}}$ 34$^{\text{m}}$·8, N. 61° 56′ : 5·5, 10·1 : 151°·8 : 1″·4 : ’79. Storey, ’10 : 346°·4 : 1″·2. Bin.

Σ 2199. xvii$^{\text{h}}$ 37$^{\text{m}}$·1, N. 55° 48′ : 7·2, 7·8 : 116°·4 : 1″·7. Storey, ’09 : 80°·6.

Σ 2207. xvii$^{\text{h}}$ 37$^{\text{m}}$·2, N. 67° 10′ : 8, 8·5 : 128°·1 : 1″·1.

Σ 2218. xvii$^{\text{h}}$ 39$^{\text{m}}$·8, N. 63° 43′ : 6·5, 7·7 : 356°·7 : 2″·5. w., ash. Storey, ’10 : 345°·2 : 2″·2.

Σ 2219. xvii$^{\text{h}}$ 40$^{\text{m}}$·5, N. 61° 39′ : 8, 9 : 103°·7 : 17″·7. Fr., ’15 : 99°·5.

Σ 2225. xvii$^{\text{h}}$ 43$^{\text{m}}$·3, N. 51° 59′ : 8·9, 9·2 : 319°·4 : 9″·1. Lewis, ’04 : 310°·7 : De., pair *f*, 8·4, 11·6. Lewis, ’04 : 335°·1 : 5″·9.

ψ^1 (Σ 2241). xvii$^{\text{h}}$ 43$^{\text{m}}$·4, N. 72° 12′ : 4, 5·2 : 15°·1 : 30″·9. w. Y., lilac, ’50, so Fr., ’76. c.p.m.; distant, 10·5.

γ (β 633). xvii$^{\text{h}}$ 54$^{\text{m}}$·6, N. 51° 30′ : 2, 13·2 : 151°·9 : 20″·9.

Σ 2261. xvii$^{\text{h}}$ 56$^{\text{m}}$·3, N. 52° 14′ : 7·5, 9·5 : 262°·5 : 9″·2.

Σ 2271. xvii$^{\text{h}}$ 58$^{\text{m}}$·6, N. 52° 51′ : 7·3, 8·3 : 262°·3 : 1″·9.

Σ 2273. xvii$^{\text{h}}$ 58$^{\text{m}}$·8, N. 64° 9′ : 6·8, 7·3 : 284°·7 : 20″·5 : yw., blsh w. β, *comes* 12 : 265°·4 : 23″·6.

Σ 2284. xviii$^{\text{h}}$ 1$^{\text{m}}$·3, N. 65° 57′ : 7·6, 9·2 : 193°·7 : 3″·7 : ysh., ash.

Σ 2278. xviii$^{\text{h}}$ 1$^{\text{m}}$·5, N. 56° 26′ : 6·8 : double *comes* (7·3, 7·8 : 147°·8 : 6″) at 22°·5 : 38″·9.

Σ 2279. xviii$^{\text{h}}$ 2$^{\text{m}}$·7, N. 50° 52′ : 8·7, 8·8 : 182°·8 : 13″.

40 (Σ 2308). xviii$^{\text{h}}$ 6$^{\text{m}}$·0, N. 80° 0′ : 5·4, 6·1 : 235°·6 :

20″·6 : w. Y., paler y., $3\frac{7}{10}$-in., '56, so $5\frac{1}{2}$-in., '63 : grouped finely with a smaller lilac star. Fr., '15 : 233°·2 : 19″·7 : pale y.

Σ 2307. XVIII^h 11^m·8, N. 69° 14′ : 8·5, 8·5 : 205°·2 : 4″·3.

β 1274. XVIII^h 13^m·3, N. 56° 34′ : has triple *comes* : 239°1 : 95″·6 : 9·8, 10·6, 10·4 : 147°·1, 8°·5 : 0″·9, 5″.

φ (OΣ 353). XVIII^h 21^m·9, N. 71° 17′ : 4·8, 6·5 : 60°·5 : 0″·5. Fixed ?

39 (Σ 2323). XVIII^h 22^m·8, N. 58° 45′ : 4·7, 7·7, 7·1 : 5°·9, 21°·7 : 3″·1, 89″ : yw., blsh., w., ash. W., ruddy, lilac, '50.

Σ 2348. XVIII^h 32^m·1, N. 52° 17′ : 5·9, 8·1 : 272°·7 : 25″·7 : v. y., v. bl.

Σ 2357. XVIII^h 32^m·4, N. 63° 39′ : 8·3, 9 : 270°·9 : 4″·5.

Σ 2368. XVIII^h 37^m·0, N. 52° 16′ : 7·2, 7·4 : 331°·2 : 2″.

46 (H*h*. 575). XVIII^h 41^m·1, N. 55° 27′ : 5, 9. Full y., clear bl. Fine contrast. Very wide.

Σ 2403. XVIII^h 43^m·4, N. 60° 57′ : 6·2, 9 : 258°·7 : 1″·9 : y., bl. Storey, '10 : 263°·9 : 1″·6.

β 971. XVIII^h 45^m·0, N. 49° 19′ : 6·5, 8·5 : 354°·7 : 0″·5. A., '06 to '12, single.

o (Σ 2420). XVIII^h 50^m·0, N. 59° 17′ : 4·6, 7·6 : 346°·2 : 30″·3 : v. y., ash. Fr., '15 : 332°·2 : 32″·4 : or. y., bl. Deep y., bl., '50. 4^m *p*, 3′ *s* Σ 2410 : 8·2, 8·7 : 97°·5 : 1″·5 ; elongated ? $3\frac{7}{10}$-in., '50, 8^m *p o*, 11′ *n* is Σ 2398 : 8·2, 8·7 : 134°·4 : 12″·4 : '32 ; β, '07 : 151°·7 : 17″·1, a binary with the large p.m. of 2″·3 annually, now apparently at its greatest elongation.

β 1255. XVIII^h 52^m·7, N. 48° 46′ : 5·8, 12·5 : 88° : 1″·6.

Σ 2440. XVIII^h 56^m·1, N. 62° 17′ : 6·2, 9·0 : 123°·4 : 16″·6 : y., o. Fr., '14 : 17″·4 : pale y., bl.

Σ 2452. XVIII^h 56^m·3, N. 75° 41′ : 6·7, 7·5 : 219°·8 : 5″·7.

Σ 2451. xix^h 1^m·0, N. 51° 28′ : 8·7, 9 : 58°·1 : 2″·6. Storey, '10 : 70°·7 : 2″·2.

Σ 2478. xix^h 2^m·9, N. 69° 20′ : 8·8, 8·8 : 290°·2 : 1″·3.

Σ 2550. xix^h 28^m·4, N. 73° 12′ : 8·2, 8·2 : 248°·8 : 2″.

Σ 2549. xix^h 30^m·3, N. 63° 8′ : 7·7, 8·9, 7·7 : 291°·3, 278°·8 : 21″·1, 47″·5. *β comes* to C. : 12·7 : 329°·1 : 2″.

Σ I 44. xix^h 31^m·9, N. 59° 59′ : 5·2, 7·2 : 287°·1 : 76″·6 : gold, bl.

Σ 2553. xix^h 32^m·3, N. 61° 52′ : 8·4, 9·2 : 80°·3 : 1″·1. Storey, '10 : 103°·8. Bird, minute *comes nf.*

Σ 2554. xix^h 32^m·7, N. 60° 6′ : 7·9, 8·4 : 197°·3 : 18″·8. Fr., '14 : 194°·9.

Σ 2571. xix^h 33^m·3, N. 78° 5′ : 7·3, 8 : 23°·2 : 11″·3. Fr., '15 : 20°·8.

Σ 2573. xix^h 39^m·0, N. 60° 20′ : 6·2, 8·5 : 29°·7 : 18″·1 : w., bl. Fr., '15 : 26°·8.

ε (*Σ* 2603). xix^h 48^m·5, N. 70° 4′ : 4, 7·6 : 354°·5 : 2″·8 : y., bl. Storey, '10 : 4°·6 : 3″·2. 7·6 suspected var. Contrast very pleasing.

Σ 2604. xix^h 51^m·9, N. 63° 58′ : 6·5, 8·7 : 184°·6 : 27″·8 : y., bl.

Σ 2617. xix^h 53^m·0, N. 75° 11′ : 8·5, 9 : 42° : 27″·7.

Σ 2642. xx^h 4^m·5, N. 63° 28′ : 8·7, 8·7 : 165°·2 : 2″·4. Storey, '10 : 177°·7. 9′ *n* is *Σ* 2640 : 6, 9·9 : 27°·2 : 4″·9. Storey, '10 : 20°·1 : 5″·8.

Σ 2660. xx^h 11^m·0, N. 64° 16′ : 8·2, 9 : 167°·6 : 22″ : w., ash.

Σ 2694. xx^h 19^m·3, N. 80° 17′ : 6·5, 10·5 : 345°·9 : 3″·7.

Stars with Remarkable Spectra, and Variables.

κ. xii^h 30^m·1, N. 70° 14′ : 3·8 : Hy. : Pickering.

RY (var.). xii^h 53^m·3, N. 66° 25′ : 7·3 : Fleming. IV.

Es.-Birm. 420. xiv^{h} 56^{m}·3, N. 66° 15′ : 4·5 : III : Se.

TW (var.). xv^{h} 32^{m}·7, N. 64° 29′ : 7·8–9·8 : 2^{d}·81. Algol type. Cannon.

R (var.). xvi^{h} 32^{m}·4, N. 66° 55′ : 7–12·7 : 245^{d}·6 : Geelmuyden.

S (var.). xvi^{h} 41^{m}·2, N. 55° 5′ : 7·5–9·3 : ? : Es.

Es.-Birm. 494. xvii^{h} 24^{m}·5, N. 71° 56′ : 6·8 : III : Du.

T (var.). xvii^{h} 55^{m}·1, N. 58° 13′ : 7·5–12·2 : 426^{d} : Es. IV.

Es-Birm. 607. xix^{h} 24^{m}·4, N. 76° 25′ : 6·5 ; IV. : Se. Var. Es.

NEBULÆ.

3147 (H. I 79). x^{h} 10^{m}·1, N. 73° 50′ : D'A., nucleus.

5866 (H. I 215). xv^{h} 4^{m}·3, N. 56° 5′ : H., very bright. D'A., 90″ × 30″. Not gaseous.

6543 (H. IV 37). xvii^{h} 58^{m}·6, N. 66° 38′ : Plan. very curious. D'A., '*unica prope inter nebulas*.' I found very luminous disc, much like a considerable star out of focus. H., 35″ diam. ; I saw but 15″ or 20″ with $3\frac{7}{10}$-in. : D'A., 23″ × 18″. Sm., pale blue. H., very small nucleus ; Bird, '63, 12-in. silv. mirror, like a 10 m^{g}. star ; D'A., 11–12 m^{g}., w. Huggins, gaseous spectrum ; the first of these surprising discoveries, '64, Aug. 29. Nearly half-way between Polaris and γ Draconis in pole of Ecliptic. About 40′ *np*, Bird finds a delicate triple star, 8·4, 8·5, 11·0 between them.

EQUULEUS.

This little asterism is easily recognised by the clustering of its stars, and its bearing from Pegasus. There are some good objects, and many interesting low-powered fields.

DOUBLE STARS.

Σ 2733. xx^h 43^m·8, N. 7° 2′ : 8, 8·3 : 145°·4 : 40″·2.

Σ 2735. xx^h 51^m·7, N. 4° 13′ : 6·2, 7·7 : 289°·7 : 2″·1 : v.y., ash. Elong. 80 ; clearly divided, 144 : y., purple, '51.

ε (Σ 2737). xx^h 55^m·1, N. 3° 59′ : 5·7, 6·2 : 294°·0 : 0″·3, '35 Bin. widening till '70, 1″·1 ; now closing. Bryant, '12 : 0″·3. Orbit almost in line of sight. A 7·1 : 77°·9 : 11″. Bies., '10 : 73°·2 : ysh., ysh., ashy. w. 13 m^g. *nf*, '71.

λ (Σ 2742). xx^h 58^m·3, N. 6° 52′ : 7·1, 7·1 : 224°·7 : 2″·6. Beautiful pair ; Sm., very faint star. *np*.

Σ 2744. xx^h 59^m·0, N. 1° 13′ : 190°·5 : 1″·5. Ph., '13 : 157°·6 : 1″·3.

OΣ 527. xxi^h 4^m·0, N. 4° 50′ : 6·5, 8 : 306°·6 : 0″·4. Bryant, '01 : 267°·4 : 0″·3.

γ (Σ I 54). xxi^h 6^m·4, N. 9° 49′ : 4·2, 5·7 : y., w. A striking pair. K. doubled 4·2, 11 : 276°·8 : 2″·1. Sa. and β, *comes*, 12 : 7°·9 : 44″·3.

Σ 2765. xxi^h 7^m·1, N. 9° 14′ : 7·8, 8 : 85°·7 : 3″.

β 270. xxi^h 9^m·5, N. 6° 53′ ; 7·4, 9·7. De., 354°·6 : 0″·6. A., '98 : 344°·9 : *comes*, 12·7 : 32°·7 : 32″·6. *s.* of two.

δ (OΣ 535). xxi^h 10^m·4, N. 9° 41′ : 4·5, 5 : the most rapid bin. known. Per., 5·7 yrs. ; distance never exceeds 0″·4. A., '12 : 209°·3 : 0″·13. Angles increasing. Dist. 10·2 being left behind (Hu., '01 : 18°·4 : 44″). Followed by 3 little stars singularly arranged in a straight line.

Σ 2786. xxi^h 15^m·7, N. 9° 11′ : 7, 8·1 : 183°·6 : 2″·5.

Σ 2787. xxi^h 17^m·7, N. 1° 41′ : 7, 8·3 : 19°·5 : 22″·7.

β (h. 3023). xxi^h 18^m·9, N. 6° 28′ : 5, 14, 15 : β, 306°, 275°·3 :

68″·5, 93″·5. 14 has *comes*, 15, β, 7°·8 : 5″·8. $3\frac{7}{10}$-in. showed 14 ? only ; 9-in. spec. 14 and 15, now the larger, '71. All easy, β 6-in. achr. and Sa. 6½-in. spec. Gore glimpsed 14 and 15, 3-in., achr. β fainter *comes* : 258°·6 : 33″·9.

Σ 2791. XXI^{h} 19^{m}·7, N. 4° 1′ : 8·5, 9 : 104°·4 : 2″·4.

Σ 2793. XXI^{h} 21^{m}·2, N. 9° 2′ : 7, 8·7 : 242°·2 : 26″·5. β, divides 7 into 7·6, 7·8 : 240°·2 : 0″·5.

VARIABLE STAR.

R (var.). XXI^{h} 10^{m}·3, N. 12° 33′ : $8<12$: 312^{d} : Anderson.

ERIDANUS.

A constellation winding down to S. horizon, its *lucida* being out of sight in our latitudes.

DOUBLE STARS.

Σ 315. II^{h} 45^{m}·4, S. 10° 53′ : 7·5, 8·7 : 160°·2 : 2″·5.

ρ^2 (β 11). II^{h} 58^{m}·6, S. 7° 59′ : 6, 10·2 : 85°·1 : 2″·5.

12 (h. 3555). III^{h} 7^{m}·7, S. 29° 19′ : 3, 8 : 310° : 5″·3 : yw., green, '35. A., '98 : 329° : 1″·4 : closing. Bin. ?

β 84. III^{h} 12^{m}·1, S. 6° 13′ : 7·2, 7·4 : 27°·3 : 0″·7.

15 (See 23). III^{h} 14^{m}·8, S. 22° 48′ : 4·7, 7·3 : 289°·9 : 0″·3. A., '08 : 277°·4.

h. 3565. III^{h} 15^{m}·0, S. 18° 51′ : 5, 9 : 104°·1 : 5″·8.

τ^4 (Jacob 1). III^{h} 16^{m}·0, S. 22° 3′ : 4½, 10, 10·5 : 287°, 99° : 5″·5, 40″.

β 531. III^{h} 19^{m}·4, S. 8° 4′ : 6·5, 11·7 : 53°·6 : 2″·9.

Σ 408. III^{h} 26^{m}·7, S. 4° 33′ : 8, 8·2 : 347°·6 : 1″·4. Do., '02 : 333°·6.

Σ 422. III^h 32^m·7, N. 0° 20′ : 6, 8·2 : 232°·2 : 6″·1 : gold, bl. β, ’03 : 249°·1.

Σ 436. III^h 37^m·1, S. 12° 52′ : 7, 8·2 : 232°·4 : 30″·2. Fr., ’15 : 236°·5 : 37″·9. r.m.

30 (h. 338). III^h 48^m·7, S. 5° 36′ : 5, 10·2 : β, 135°·3 : 8″·3.

32 (Σ 470). III^h 50^m·3, S. 3° 12′ : 4, 6 : 347°·3 : 6″·7 : y., bl. Topaz, bright green, ’50. Se., cols. *magnifici, superbi.* A little *np* are Σ 466 : 8·2, 10·5 : 59°·7 : 8″·1 : y. o.; and Σ 468 : 8·7, 9·7 : 97°·7 : 20″·1 (β doubles *comes* : 81°·1 : 1″).

Σ 487. III^h 57^m·1, S. 10° 40′ : 8·7, 9·2, 10·3 : 8°·7, 237°·4 : 11″·9, 21″·7.

Σ 489. III^h 58^m·5, S. 7° 13′ : 8·5, 8·7 : 195°·1 : 3″·3.

Σ 510. IV^h 8^m·0, N. 0° 32′ : 6·5, 9·5 : 300°·5 : 10″·8 : vy., o. Fr., ’15 : 302°·8 : 11″·4.

Hu. 30. IV^h 9^m·7, S. 23° 20′ : 6·6, 13·7 : 176°·7 : 5″·3.

39 (Σ 516). IV^h 10^m·6, S. 10° 27′ : 6, 9 : 153°·9 : 6″·3 : y., bl.

o^2 (Σ 518). IV^h 11^m·6, S. 7° 46′ : 4, 9·1 : 107°·5 : 82″·3 : vy., o. Y., bl., ’50. H. found *comes* double 1783, at 326°·7. It closed to 2″·2, ’93, and is now widening. A., ’12 : 29°·6 : 2″·7. Per. 180 years. The stars are all moving together with the large p.m. of 4″ annually. A 12 m^g. *comes* is fixed. 3½^m *f* is Σ 527 : 8, 10·8 : 190°·3 : 5″·5. 3^m *p*, 37′ *n* is Σ 514 : 8·5, 10·3 : 76°·4 : 7″·7.

Hu. 438. IV^h 16^m·5, S. 16° 38′ : 6·5, 14·2 : 162°·8 : 4″·3.

β 744. IV^h 18^m·2, S. 25° 26′ : 7·6, 7·6 : 306°·6 : 0″·8. Oliver, ’10 : 339°·4. Two *comites* (h. 3644), 11·3, 8·6 : 7°·2, 40°·8 : 35″·8, 44″·9.

Σ 536. IV^h 18^m·2, S. 4° 52′ : 8·1, 8·7 : 152°·4 : 1″·8. A., ’98 : 163°·1.

Σ 544. IV^h 20^m·9, S. 8° 55′ : 8·3, 9·2 : 356°·7 : 2″·1.

β 403. IV^h 21^m·3, S. 2° 14′ : De., 7, 8·5 : 100°·9 : 2″.

β 311. IV^{h} 23^{m}·5, S. 24° 15′ : 6·5, 7 : 146°·9 : 1″·1.

β 184. IV^{h} 24^{m}·5, S. 21° 40′ : 7, 8 : 263°·9 : 1″·1.

46 (β 881). IV^{h} 31^{m}·0, S. 6° 55′ : 6, 10·8 : 57° : 1″·5. Doo., ’04 : 44° : 1″·8.

Σ 570. IV^{h} 31^{m}·4, S. 9° 54′ : 7, 8 : 258°·9 : 12″·8 : w., blsh.

Σ 571. IV^{h} 32^{m}·0, S. 3° 45′ : 6·3, 11 : 258°·7 : 17″·8.

Σ 576. IV^{h} 34^{m}·3, S. 13° 11′ : 6·7, 7·2 : 172° : 12″·3.

55 (Σ 590). IV^{h} 39^{m}·7, S. 8° 56′ : 6·2, 6·7 : 318°·3 : 9″·1.

β 186. IV^{h} 42^{m}·1, S. 7° 7′ : De., 8·1, 11 : 174°·1 : 2″.

β 316. IV^{h} 48^{m}·8, S. 5° 25′ : De., 8·1, 8·2 : 176°·8 : 1″·2. Beautiful, in field *n* of *ω*.

62 (H*h*. 138). IV^{h} 52^{m}·5, S. 5° 18′ : 6, 8 : South, 74°·7 : 65″·9. Pale y., lilac, ’50. 1^{m} *f*, 35′ *s* is Σ 624 : 8·1, 8·6 : 88°·6 : 28″·4.

Σ 636. IV^{h} 59^{m}·2, S. 8° 46′ : 7·5, 8·6 : 100°·4 : 3″·7.

66 (Σ 642 rej.). V^{h} 2^{m}·8, S. 4° 46′ : β, 6, 9·2 : 9°·4 : 52″·5.

Σ 649. V^{h} 4^{m}·5, S. 8° 46′ : 7, 8·7 : 80°·8 : 21″·6 : w., bl. h., 8·7 v. ruddy. β, ’04 : 74°·9.

STARS WITH REMARKABLE SPECTRA, AND VARIABLES.

Var. II^{h} 44^{m}·1, S. 12° 49′ : 6·5–7·5 : Pickering.

Var. II^{h} 48^{m}·3, S. 8° 36′ : 7·2–8 : Pickering.

π. III^{h} 42^{m}·4, S. 12° 21′ : 4·7 : III : Pickering.

U (var.). III^{h} 47^{m}·1, S. 25° 12′ : 8·5<11 : 239^{d} : Cordoba.

T (var.). III^{h} 51^{m}·8, S. 24° 16′ : 7·4–11·8 : 252^{d} : Fleming.

γ. III^{h} 54^{m}·3, S. 13° 44′ : 2·8 : III : Se.

W (var.). IV^{h} 8^{m}·1, S. 25° 21′ : 8·1<12·5 : 374^{d} : Fleming.

Star. IV^{h} 24^{m}·4, S. 13° 13′ : 5·5 : Hy. : Har.

47. IV^{h} 30^{m}·4, S. 8° 23′ : 5·4 : III : D’A.

54. IV^{h} 36^{m}·9, S. 19° 49′ : 4·6 : III : D’A.

Star. IV^{h} 44^{m}·6, S. 5° 48′ : 6 : Hy. : Har.

Es.-Birm. 117. V^{h} 5^{m}·9, S. 5° 37′ : 8·7 : W. IV. Du.

NEBULÆ.

1084 (H. I 64). II^{h} 42^{m}·1, S. 7° 55′. Oval; D'A., 80″ × 50″.

1332 (H. I 60). III^{h} 22^{m}·7, S. 21° 37′. Neb.

1407 (H. I 107). III^{h} 36^{m}·6, S. 18° 50′. Neb., fainter *p*.

1535 (H. IV 26). IV^{h} 10^{m}·5, S. 12°54′. Plan. bright and round, with low powers of $3\frac{7}{10}$-in., but not bearing magnifying. La. has described it as the most interesting and extraordinary object of the kind he had ever seen: an 11 m^{g}. star standing in the centre of a circular nebula, itself placed centrally upon a larger and fainter circle of hazy light. D'A. did not see this, but thought nucl. excentric, edges resolvable, and col. light bl., as E. of Rosse, who makes nucl. granular. Gaseous. Har.

FORNAX.

A small constellation, low in our latitudes.

DOUBLE STARS.

ω (h. 3506). II^{h} 30^{m}·4, S. 28° 35′ : 6½, 8 : Solá : 244°·4 : 10″·5.
γ (β 877). II^{h} 46^{m}·3, S. 24° 53′ : 6, 13 : 144°·4 : 11″·5.
See 25. III^{h} 23^{m}·4, S. 28° 50′ : 6·5, 11·8 : 18° : 9″·9.
See 26. III^{h} 29^{m}·0, S. 24° 53′ : 6, 6 : 180° : 0″·2.

VARIABLES.

R (var.). II^{h} 25^{m}·7, S. 26° 27′ : 8·5–11·8 : 386^{d}. Cordoba.
T (var.). III^{h} 26^{m}·2, S. 28° 41′ : 8·5–9·7 : 92^{d} ? Cape.

NEBULA.

1097 (H. V 48). II^{h} 42^{m}·9, S. 30° 36′ : very bright and large.

GEMINI.

The leading stars, in the heads of the two figures, are well known, but it requires a little attention to the globe or map to make out the whole constellation.

DOUBLE STARS.

Σ 830. v^{h} 58^{m}·4, N. 27° 39′ : 8·2, 8·7, 10·8 : 249°·6, 187°·7 : 12″·8, 25″·2 : ysh., o., o.

OΣ 134. vi^{h} 4^{m}·4, N. 24° 27′ : 7, 8·3 : 188°·1 : 31″.

3 (β 1241). vi^{h} 4^{m}·9, N. 23° 8′ : 5·9, 10 : 344°·7 : 0″·5. *Comes*, 14·5 : 63°·3 : 18″·4.

4 (β 1058). vi^{h} 5^{m}·6, N. 23° 1′ : 6·3, 6·4 : 284°·3 : 0″·4. Bryant, '11 : 268°·4.

η (β 1008). vi^{h} 10^{m}·1, N. 22° 32′ : 3, 10·5 : 301° : 1″ : '82. Doo., '08 : 280°·6. Var. 3·2–4·2 : 231^{d}·4. Schmidt. Spect. bin. It and μ, fine III. Glorious sweeping here.

Σ 897. vi^{h} 17^{m}·5, N. 26° 43′ : 8·2, 8·5 : 348°·9 : 18″·1.

Σ 899. vi^{h} 18^{m}·2, N. 17° 37′ : 7, 8 : 20°·3 : 2″·4 : yw., w.

μ (S.C.C. 243). vi^{h} 18^{m}·1, N. 22° 33′ : Sm., 3, 11 : β, 76°·6 : 73″ : crocus y., blsh. 11 much brighter than *comes* of β, marked 11½ by Sm., '49. 11 very small, 5½-in. '63. Sa., 13, '74. Fr., 13–14, '77. β finds distant *comes* (P. 141° : 122″) double ; 9·8, 10·7 : 266°·7 : 0″·8.

15 (H*h*. 223). vi^{h} 23^{m}·0, N. 20° 51′ : 6, 8 : β, 204°·5 : 29″. Wsh., blsh., '49. K., y., purple, '72.

ν (OΣΣ 77). vi^{h} 24^{m}·2, N. 20° 16′ : De., 4·2, 8 : 329°·1 : 112″·6 : blsh. w., ashy y. β doubles 8 : 8·7, 8·8 : 346°·2 : 0″·15 ; and sees 15 m^{g}. *comes* to 4·2 at 358° : 22″·6.

20 (Σ 924). vi^{h} 27^{m}·6, N. 17° 51′ : 6, 6·9 : 209°·8 : 20″ : yw., blsh. w. Y., bl., '51. Fine field.

Σ 932. vi^{h} 29^{m}·8, N. 14° 49′ : 8·2, 8·3 : 341°·7 : 2″·4. Bowyer, '11 : 234°·9 : 2″.

OΣ 149. vi^{h} 31^{m}·4, N. 27° 21′ : 6·5, 9 : 350°·7 : 0″·5. Bowyer, '11 : 269°·6 : 0″·5.

Σ 942. vi^{h} 32^{m}·8, N. 23° 43′ : 9, 9·2 : 244°·1 : 3″·3. 28′ *s* is Σ 943 : 8·5, 9 : 165°·9 : 15″·5, '29. Fr., '15 : 142°·9 : 22″·4. β, *comes*, 13·5 : 284°·8 : 13″·8.

γ. vi^{h} 33^{m}·8, N. 16° 28′ : 3 : brilliant w. With low power minute stars radiate from it every way. Pretty field.

β 571. vi^{h} 35^{m}·3, N. 13° 3′ : 6, 12 : 316°·2 : 2″·7.

ε (H*h*. 246). vi^{h} 39^{m}·0, N. 25° 13′ : Sm., 3, 9·5 : 94°·1 : 110″·6 : brilliant w., cerul. bl., '31. 3 strong y., '49.

Σ 957. vi^{h} 40^{m}·0, N. 30° 55′ : 7·5, 9 : 95°·6 : 3″·4 : w., ash.

Field with several pairs. vi^{h} 41^{m}, N. 12° 58′.

OΣ 156. vi^{h} 42^{m}·7, N. 18° 17′ : 6·5, 7 : 346°·8 : 0″·4. Bowyer, '11 : 298°·7.

Σ 962. vi^{h} 43^{m}·2, N. 26° 48′ : 8·5, 8·5 : 241°·2 : 25″·7.

36 (β 1193). vi^{h} 46^{m}·8, N. 21° 51′ : 5·7, 14·5 : 355° : 10″·8.

Σ 976. vi^{h} 46^{m}·7, N. 18° 47′ : 8, 8·8 : 117°·6 : 35″·7.

38 (Σ 982). vi^{h} 50^{m}·1, N. 13° 17′ : 5·4, 7·7 : 174°·9 : 5″·7 : ysh., blsh. Yw., purple, '50. Ph., '14 : 157°·0 : 6″·5.

OΣ 161 rej. vi^{h} 50^{m}·2, N. 21° 40′ : 6·5, 10·8 : 172° : 19″·7.

Σ 981. vi^{h} 50^{m}·3, N. 30° 16′ : 8, 8 : 149°·3 : 3″·7. Bird, minute pair suspected *np*.

Σ 991. vi^{h} 52^{m}·1, N. 25° 4′ : 8, 9 : 172°·4 : 3″·8 : v.w. blsh. Bowyer, '08 : 166°·3.

Fine group (OΣΣ 80). vi^{h} 53^{m}·6, N. 14° 21′.

Σ 1000. vi^{h} 54^{m}·4, N. 25° 21′ : 7·7, 8·7 : 66°·9 : 22″·4. A. divides 7·7 : 8·2, 8·5 : 314°·5 : 0″·3.

Espin 339. vi^{h} 54^{m}·8, N. 32° 33′ : 6·5, 13 : 136°·7 : 16″·4.

ζ (OΣΣ 81). vi^{h} 59^{m}·4, N. 20° 42′ : β, 350°·5 : 95″·1. Sm., *comes*, 13 : β, 83°·5 : 87″·2 ; a glimpse star, $3\frac{7}{10}$-in. Sa., very easy, $2\frac{1}{2}$-in. achr. Sa. and Wa., another 20″ from 7·2. Schm., 4 var. 3·7–4·5 : 10^{d}·1. Sp. Bin.

Σ 1014. vii^{h} 0^{m}·8, N. 26° 16′ : 8·7, 8·7 : 32°·2 : 2″·1.

Σ 1017. vii^{h} 2^{m}·6, N. 16° 58′ : 8·5, 9·2 : 254° : 12″·2.

Σ 1023. vii^{h} 3^{m}·6, N. 25° 7′ : 8, 8·5 : 101°·8 : 24″·7 : ysh.

45 (OΣ 165). vii^{h} 3^{m}·8, N. 16° 3′ : 5, 10·7 : 89°·7 : 2″·9 : gold, o. Furner, '11 : 34°·5 : 5″·2. p.m.

Σ 1027. vii^{h} 4^{m}·2, N. 17° 2′ : 8·1, 8·2 : 356°·2 : 6″·7.

τ (β 1009). vii^{h} 6^{m}·1, N. 30° 22′ : 5, 11·5 : 178°·2 : 1″·9.

Σ 1035. vii^{h} 7^{m}·2, N. 22° 25′ : 7·4, 7·4 : 39°·6 : 8″·5 : ysh. ; very pretty.

Σ 1037. vii^{h} 7^{m}·8, N. 27° 22′ : 7·1, 7·1 : 332°·7 : 1″·1 : ysh. Bowyer, '11 : 293°·9 : 0″·4. OΣ, *comes*. Hu., 13 : 110°·6 : 16″·3.

Σ 1054. vii^{h} 12^{m}·8, N. 35° 6′ : 7·3, 8·5 : 291°·5 : 18″·6 : yw., blsh. w.

λ (Σ 1061). vii^{h} 13^{m}·5, N. 16° 42′ : 3·2, 10·3 : 30°·9 : 9″·6 : grnsh. bl., o. c.p.m.

Σ 1070. vii^{h} 15^{m}·1, N. 34° 12′ : 8·2, 9·2 : 319°·2 : 1″·9. Bowyer, '03 : 323°·5.

Σ 1068. vii^{h} 15^{m}·3, N. 13° 32′ : 8·3, 9 : 354°·3 : 3″·9.

δ (Σ 1066). vii^{h} 15^{m}·3, N. 22° 8′ : 3·2, 8·2 : 196°·9 : 7″·1 : ysh., purpsh., '39. Furner, '11 : 212°·1 : 6″·4. Pale y., rsh., '52. Sa., *comes*, est. 180° : 85″.

Σ 1081. vii^{h} 18^{m}·4, N. 21° 37′ : 7·8, 8·5 : 216°·1 : 1″·3. Bowyer, '11 : 228°·6.

Σ 1083. vii^{h} 20^{m}·9, N. 20° 40′ : 6·8, 7·8 : 42°·6 : 6″·2 : yw., blsh. w. Sa., very small star, *nf*.

Σ 1088. VII^h 21^m·5, N. 14° 15′ : 7, 9 : 195°·1 : 11″·1. In field is *Σ* 1087 : 8·2, 11·5 : 41°·9 : 19″·9.

Σ 1089. VII^h 21^m·7, N. 15° 0′ : 8·5, 8·5 : 8° : 7″·2. 1^m *f*, 34′ *n* is *Σ* 1094 : 7·7, 8·7 : 96°·3 : 2″·4.

Σ 1090. VII^h 21^m·8, N. 18° 41′ : 7·8, 9·5 : 97°·4, 318°·5 : 61″·1, 19″·7. Fr., '15 : 60″·4, and 322° : 20″·1.

H*h*. 264. VII^h 22^m·9, N. 22° 30′ : K., 7·6, 9·3 : 276°·7 : 36″ : or., bl. Cols. very fine. Es., *comes* : 13·5 : 23°·9 : 11″·3. 40′ *n* of 63, 6 m^g., with three small attendants.

ρ (A. 2124). VII^h 24^m·0, N. 31° 57′ : 4·2, 12·5 : 11°·4 : 2″·8.

65 (*β* 1194). VII^h 24^m·8, N. 28° 5′ : 5·5, 14 : 289°·5 : 13″·9.

Σ 1106. VII^h 26^m·8, N. 16° 29′ : 8·7, 8·7 : 211°·2 : 10″·6.

Σ 1108. VII^h 28^m·1, N. 23° 4′ : 6·7, 8·5 : 179°·1 : 11″·6 : yw., blsh. Beautiful.

α (*Σ* 1110). VII^h 29^m·5, N. 32° 4′ : 2·7, 3·7 : 262°·5 : 4″·4 : grnsh., '26. Ph., '14 : 219°·3 : 5″·0. Castor. h. calls this the largest and finest of all the double stars in our hemisphere; the certainty of its motion fully convinced H. of the existence of binary systems. Both stars are spect. bin. A small star (*Σ*, 9·5 : 162°·5 : 72″·5) belongs to the system, and has been thought var. *Σ* once 10 : De., 8·5, 9·5, 9 : Es., 8·6 : reddish or purple, '90. Maw, 11. Excellent objects for small telescopes. Nearly 1° *s*, a little *f*, is O*Σ* 175 : 6, 6·6 : De., 332°·1 : 0″·8 : '67, apparently fixed. Found also by Bird with 12-in. spec., and seen by Buffham with 9-in. ditto. Orange, bl. Beautifully divided, 9⅓-in. spec., '78.

70 (*β* 200). VII^h 33^m·6, N. 35° 14′ : 5 m^g., has at 98°·7 : 162″, double *comes* : 10, 11 : 241°·8 : 1″·5, and two others, 13 and 11, nearer. N. star of a curve to naked eye.

Σ 1124. VII^{h} 36^{m}·2, N. 22° 0′ : 8·2, 8·4 : 325°·6 : 19″·4. In pretty group.

Σ 1129. VII^{h} 37^{m}·5, N. 18° 15′ : 8·2, 8·7 : 62°·6 : 21″·7. 3 minute stars *np*.

κ (OΣ 179). VII^{h} 39^{m}·6, N. 24° 36′ : 4, 8·5 : 231°·7 : 6″·3. Very delicate and beautiful.

β (β 580). VII^{h} 40^{m}·4, N. 28° 13′ ; *comes* at 71°·8 : 187″·7, double : 10, 12·5 : 128° : 1″·4. There is also a 14·8 at 280° : 29″·6.

Σ 1140. VII^{h} 43^{m}·8, N. 18° 32′ : 6·8, 8·5 : 273°·9 : 6″·2 : y., v. bl.

Σ 1147. VII^{h} 45^{m}·5, N. 24° 44′ : 9, 9 : 162°·3 : 2″·5.

Stars with Remarkable Spectra, and Variables.

η and ζ, see under double stars.

Es.-Birm. 172. VI^{h} 5^{m}·9, N. 26° 2′ : IV : D'A. Var.

Es.-Birm. 173. VI^{h} 7^{m}·0, N. 21° 54′ : R. : B. III.

Es.-Birm. 174. VI^{h} 7^{m}·5, N. 22° 56′ : R. : W. III.

Es.-Birm. 175. VI^{h} 8^{m}·5, N. 27° 11′ : 9 : R. : h. IV.

Es.-Birm. 184. VI^{h} 19^{m}·1, N. 25° 3′ : 9·5 : IV : Var. Es.

Es.-Birm. 187. VI^{h} 20^{m}·9, N. 14° 46′ : 6·5 : IV : Se. Var.

Es.-Birm. 189. VI^{h} 21^{m}·5, N. 19° 9′ : 9·5 : Var. : IV. Es.

W (var.). VI^{h} 30^{m}·3, N. 15° 23′ : 6·7–7·5 : 7^{d}·9. Sawyer.

Es. 564. VI^{h} 37^{m}·0, N. 31° 32′ : 8·1 : IV : var. Es.

Nova I. VI^{h} 39^{m}·1, N. 30° 2′ : 5 < 13·5. Found on the Oxford plates, 1903, by Turner. The spectrum passed through the usual changes of novæ and became that of a nebula. Barnard, '12 : 16 m^{s}., still fading.

X (var.). VI^{h} 42^{m}·0, N. 30° 22′ : 8–13 : 262^{d}. Anderson.

Nova II. VI^{h} 49^{m}·7, N. 32° 14′ : 3·3–? Disc. by Enebo, 1912, before it had reached its max. According to Pickering, the spectrum on March 13th was solar, on March 14th the hydrogen lines had broad bright bands on the edge of greater wave-length; by the 15th, the transition to the nova type was complete. There were rapid fluctuations in light subsequently, and the spectrum became discontinuous, and then nebular.

R (var.). vii^h 2^m·5, N. 22° 50′: 6·4–13·8: 370^d·2. Hind. F. and other lines bright.

51. vii^h 8^m·8, N. 16° 20′: 5·4: III: D'A.

Es.-Birm. 225. vii^h 15^m·7, N. 25° 9′: var. 8·2–9: IV.: one of a triangle. Es.

V (var.). vii^h 18^m·7, N. 13° 15′: 8–14·5: 276^d. Baxendell.

Es.-Birm. 235. vii^h 27^m·1, N. 24° 41′: 8·2: IV: Es.

S (var.). vii^h 38^m·2, N. 23° 38′: 8·2–14·5: 294^d: Hind.

T (var.). vii^h 44^m·5, N. 23° 56′: 8·1$<$13·5: 288^d·1: Hind.

U (var.). vii^h 50^m·4, N. 22° 13′: 8·9–14: 86^d·3, with great irregularities. Like SS Cygni, one of the most mysterious vars. Increase, '58, Nov., 1·5 m^g. per day. '69, 3 m^{gs}. in 24^h! White, spect. continuous. Es. once suspected a large band. Har. Class F.

Clusters and Nebulæ.

2168 (M. 35). vi^h 3^m·9, N. 24° 21′. Beautiful and extensive region of small stars, a neb. to naked eye. How differently La.'s 24-in. mirror shows it, his own words will best tell:—'A marvellously striking object. No one can see it for the first time without an exclamation. . . . The field of view, 19′ in diam. and angular subtense 53½°, is perfectly full of brilliant stars, unusually equal in magnitude, and distribution over the whole area. Nothing but a sight of the object itself can convey an adequate idea of its exquisite beauty.' Sm. observes that the stars form curves, often commencing with a larger one. There is an elegant festoon near centre, starting with a reddish star; 9-in. spec., '71. No ruddy star, Feb. 18, 21, '82. Es., pale y., '93. Between ε Gem. and ζ Tauri, a little *n*; in fine region. About ½° *sp*, just beyond a group of outliers, is 2158 (H. VI 17), a faint dim cloud of very minute stars.

Group of eleven faint neb. VII^{h} 23^{m}·4, N. 33° 59′.

2392 (H. IV 45). VII^{h} 24^{m}·4, N. 21° 5′. H. observed this object as a 9 m^{g}. star 'with a pretty bright nebulosity, equally dispersed all round; a very remarkable phenomenon.' h. describes it as an 8 m^{g}. star, 'exactly in the centre' (not exactly, E. of Rosse, D'A.) 'of an exactly round bright atmosphere, 25″ in diam.' Sm., who rates it 7·5 m^{g}., says he 'could only bring it to bear as a burred star.' I was so much surprised at the result in my inferior telescope, that I cannot help supposing some temporary impediment to distinct vision at Bedford, for on coming accidentally across it in 1850 I found such a conspicuous nebulosity that I thought it was either damp on the eye lens or a telescopic comet; and in 1852 I entered it as a 'blsh. nebulosity, quite like a telescopic comet.' 1865, with 5½-in., I perceived a very faint trace of a brighter border *s* a little *f*. The E. of Rosse saw a marvellous object—a star surrounded by a small circular neb., in which, close to the star, is a little black spot. This neb. is encompassed, first by a dark then by a luminous ring, very bright, and always flickering; perhaps a spiral. Buffham sees the dark ring with 9-in. 'With.' Key's 18-in. mirror showed two concentric bright rings and the dark spot, '68. A mass of luminous gas. It lies 2° *sf* δ.

2420 (H. VI 1). VII^{h} 33^{m}·7, N. 21° 45′. Faint mass of very small stars. h., 11–18 m^{g}. Beautiful and in rich region; 9-in. spec.

HERCULES.

Some very noteworthy telescopic objects mark this constellation; and there is very fine sweeping in its *sf* portion, the *Ramus Pomifer* of Bayer, *Cerberus* of Hevel.

DOUBLE STARS.

Σ 1956. xv^{h} 30^{m}·4, N. 42° 5′ : 8, 9·5 : 41°·4 : 2″·7. Es., ’16 : 38°·1 : 1″·7 ; in pretty field. Es., pair, 1^{m} 51^{s} *f*, 9·4, 9·6 : 150°·6 : 2″·9.

Σ 1961. xv^{h} 30^{m}·9, N. 43° 48′ : 8·7, 9 : 56° : 21″·6. Do., ’03, 40°·3 : 23″·3. r.m.

Σ 1993. xv^{h} 56^{m}·2, N. 17° 36′ : 8·2, 8·2 : 37°·7 : 34″. Fr., ’14 : 27″·9.

OΣ 304. xv^{h} 58^{m}·1, N. 39° 24′ : 6·5, 10·7 : 173°·8 : 10″·7. 25′ *n*, a little *p* is A.G. 200 : 9·3, 9·5 : *β*, 210°·9 : 3″·2.

Σ 2000. xv^{h} 59^{m}·3, N. 14° 13′ : 8·2, 9 : 230°·1 : 2″·5.

Σ 2007. xvi^{h} 2^{m}·3, N. 13° 32′ : 6·5, 8 : 328°·2 : 32″. Fr., ’14 : 324°·5 : 34″·9. p.m. A very fine pair.

κ^{1} (Σ 2010). xvi^{h} 4^{m}·5, N. 17° 16′ : 5, 6 : 9°·6 : 31″·2 : y. Light y., pale tawny, or garnet, ’50. Fr., ’15 : 11°·4 : 29″·4 : pale y., dull or.

Σ 2015. xvi^{h} 6^{m}·4, N. 45° 34′ : 7·7, 8·8 : 159°·3 : 2″·7 : v.w., blsh. w.

Σ 2022. xvi^{h} 9^{m}·5, N. 26° 52′ : 6·2, 9·8 : 129°·5 : 2″·8. Doo., ’05 : 136°·5.

Σ 2037. xvi^{h} 15^{m}·2, N. 17° 37′ : 9, 9 : 238°·2 : 1″·6.

τ (β 1198). xvi^{h} 17^{m}·3, N. 46° 31′ : 4, 13·9 : 145°·3 : 6″·6.

γ (H*h*. 506). xvi^{h} 18^{m}·4, N. 19° 20′ : De., 3·8, 8·2 : 238°·8 : 40″·5.

23 (H*h* 511). xvi^{h} 19^{m}·9, N. 32° 31′ : Sm., 6, 9 : De., 18°·9 : 34″·9.

Σ 2047. xvi^{h} 20^{m}·8, N. 47° 48′ : 7·5, 8 : 333°·2 : 2″·3.

Σ 2044. xvi^{h} 21^{m}·3, N. 37° 13′: 7·8, 8: 346°·9: 8″·5. Very pretty, easily found from M. 13, 17^{m} *p*, 23′ *s*.

ω (β 625). xvi^{h} 21^{m}·7, N. 14° 13′: 5, 11·9: 178°·2: 1″·8. An 11·5: 103°·1: 33″·8.

Hu. 748. xvi^{h} 24^{m}·5, N. 51° 36′: 6·2, 12·8: 83°·4: 6″.

Σ 2049. xvi^{h} 24^{m}·8, N. 26° 9′: 6·5, 7·5: 215°·2: 1″·1. Chapman, '11: 210°·4.

Σ 2052. xvi^{h} 25^{m}·4, N. 18° 34′: 7·5, 7·5: 109°·7: 3″. Lewis, '11: 87°·8: 1″.

Σ 2051. xvi^{h} 25^{m}·6, N. 10° 47′: 7·1, 8·6: 18°·9: 13″·5: ysh., blsh.

Σ 2056. xvi^{h} 27^{m}·7, N. 5° 37′: 7·9, 9: 318°·1: 6″: w., ash.

Σ 2057. xvi^{h} 28^{m}·1, N. 19° 28′: 9, 9·2: 264°·6: 4″·9.

Σ 2059. xvi^{h} 28^{m}·1, N. 38° 14′: 8·2, 8·3: 209°·2: 1″·2.

31 (β 816). xvi^{h} 28^{m}·5, N. 33° 42′: 6·3, 11·8: 224°·1: 5″.

Σ 2063. xvi^{h} 29^{m}·4, N. 45° 47′: 5·7, 8·2: 194°·3: 16″·2: w., o. Fr., w., purplish.

Σ 2065. xvi^{h} 30^{m}·0, N. 40° 9′: 8, 8·7: 218°·7: 30″·5. Fr., '15: 216°·6: 31″·2. 7′ *n* is OΣ 313: 7·2, 7·8: 162°·2: 0″·8. Bowyer, '11: 147°·5: 0″·9.

32 (β 818). xvi^{h} 30^{m}·4, N. 30° 40′: 6·3, 13·5: 33°·5: 3″·3.

Σ 2068. xvi^{h} 31^{m}·6, N. 47° 26′: 8·3, 8·3: 257°·1: 5″·5.

Fine wide pair. xvi^{h} 31^{m}·9, N. 17° 13′: Ar., 6·2, 7·5. Fr., '14: 359°·4: 156″·2.

Σ 2071. xvi^{h} 35^{m}·1, N. 13° 50′: 8·7, 9: 311°·6: 25″·1.

Σ 2079. xvi^{h} 36^{m}·2, N. 23° 9′: 7·1, 7·9: 90°·9: 16″·8: w. Fr., cols. different, '76.

42 (Σ 2082). xvi^{h} 36^{m}·6, N. 49° 5′: 4, 10·7: 92°·3: 22″·4: v.y., or gold, o. β, '05: 23″·7. A 12 m^{g}. *comes* forms triangle, glimpsed 3$\frac{7}{10}$-in., '51. B., 10 m^{g}., 4$\frac{1}{2}$-in., '71: with little pair in field.

36 (Σ I 31). xvi^{h} 36^{m}·7, N. 4° 22′: 6, 7: 230°·1: 69″·7. Σ, *comes* 11·5: β, 316°: 24″.

ζ (Σ 2084). xvi^h 38^m·3, N. 31° 42′ : 3, 6·5 : ysh., reddish. Bin. Lewis shows that period has increased from 31·5 years to 33·9 years, and believes 3 is double. Dist. varies from 0″·6 to 1″·6. Max. about 1920 at 90°; min. 1932 at 315°. Greenw., '12 : 126°·1 : 1″·2.

Σ 2085. xvi^h 39^m·0, N. 21° 44′ : 7·3, 8·8 : 309°·6 : 6″·1.

Σ 2083. xvi^h 39^m·1, N. 13° 45′ : 8·3, 8·8 : 336°·3 : 12″·6.

Σ 2087. xvi^h 39^m·2, N. 23° 49′ : 8·2, 8·2 : 291°·8 : 5″·7. Exquisite little object.

Σ 2091. xvi^h 39^m·5, N. 41° 20′ : 7·5, 8 : 302°·2 : 1″·3.

Σ 2094. xvi^h 40^m·8, N. 23° 39′ : 7·3, 7·6 : 82°·8 : 1″·6 : yw. *comes* : 11 : 311°·4 : 25″·3.

46 (Σ 2095). xvi^h 41^m·9, N. 28° 31′ : 7, 9 : 163°·9 : 5″ : yw., o. W., bl., '50. Fr., yw., blsh., '15.

Σ 2097. xvi^h 41^m·9, N. 35° 52′ : 8·5, 8·7 : 89°·9 : 2″·1.

Σ 2098. xvi^h 42^m·6, N. 30° 9′ : 8, 9 : 147°·2 : 14″·3. Star, 8 m^g. : 139°·7 : 64″·2. Fr., '15 : 135°·1 : 65″·8, another 9·7 : 16°·6 : 63″·7.

Σ 2101. xvi^h 42^m·9, N. 35° 47′ : 6·3, 9 : 60°·2 : 4″·3.

Σ 2103. xvi^h 45^m·9, N. 13° 24′ : 5·2, 10 : 36°·6 : 5″·7.

Σ 2104. xvi^h 45^m·9, N. 36° 4′ : 6·2, 8 : 19°·6 : 5″·9 : w., ash. Very pretty.

52 (β 627). xvi^h 46^m·9, N. 46° 8′ : 5, 10 : 309°·4 : 1″·8. A. divides *comes* : 9·5, 9·6 : 311°·7 : 0″·2.

Σ 2107. xvi^h 48^m·7, N. 28° 48′ : 6·5, 8 : 148°·6 : 1″·1 : ysh., blsh. De., 8, *sombre*. Bryant, '11 : 8°·9 : 0″·4. Bin. Dist. increasing.

56 (Σ 2110 rej.). xvi^h 51^m·7, N. 25° 52′ : β, 6, 11·9 : 93°·4 : 18″·1. 4 minute stars.

54 (β 954). xvi^h 52^m·1, N. 18° 33′ : 5, 12·3 : 175°·4 : 2″·6.

Σ 2112. xvi^h 55^m·2, N. 31° 54′ : 8·5, 9·5 : 260°·6 : 1″·9.

Σ 2115. xvi^h 57^m·9, N. 15° 3′ : 5·7, 10·5 : 238°·4 : 19″·1.

Σ 2120. xvii^h 1^m·6, N. 28° 12′ : 6·4, 9·2 : 11°·4 : 3″·8 : y., v. bl., '29. 7, 9 : 0°·2 : 3″·1 : red, bl. Cols. remarkable, '36. Fr., '15 : 238°·4 : 8″·6 : pale y., v. bl.

OΣ 324. xvii^h 5^m·0, N. 31° 19′ : 6·3, 10·8 : 222°·3 : 3″·8. 1^m *p*, 7′ *n* is Σ 2127 rej. Duncan, 8·2, 10·5 : 272°·5 : 17″·8.

Hu. 1176. xvii^h 5^m·2, N. 36° 2′ : 6, 6 : 111°·7 : 0″·1 : '05. A., '12 : 294°·7. Rapid Bin. 15 years ?

Σ 2131. xvii^h 6^m·6, N. 30° 27′ : 7·5, 8·5 : 179°·4 : 24″·3.

Σ 2135. xvii^h 8^m·7, N. 21° 19′ : 7·1, 8·4 : 166°·7: 6″·7 : ysh. blsh. Fr., '15 : 181° : 7″·7.

Σ 2142. xvii^h 9^m·6, N. 49° 50′ : 6·2, 10 : 116°·3 : 5″·3.

Σ 2137. xvii^h 10^m·3, N. 16° 2′ : 8·2, 9·2 : 145°·4 : 4″.

α (Σ 2140). xvii^h 11^m·0, N. 14° 29′ : 3, 6·1 : 118°·5 : 4″·6 : v.y., intense bl. Orange, blsh. grn., '55. A.G.C., *comes*, β, 15 : 335°·8 : 23″·5. H., 3·5 var. (3·1–3·9). Fine III.

δ (Σ 3127). xvii^h 11^m·7, N. 24° 56′ : 3, 8·1 : 173°·7 : 26″·1 : grn., ashy w. Fr., '14 : 195°·4 : 12″·5. p.m. Pale y., blsh. grn., '50. De., sometimes y., usually w., azure. K., pale y., ruddy purple '71.

68 (OΣ 328). xvii^h 14^m·4, N. 33° 11′ : 4·8, 10·2 : 61°·8 : 4″·4 : w., o. Schm., var. 4·6–5·4. P. 2^d·05. Sp. bin.

Σ 2152. xvii^h 15^m·4, N. 45° 40′ ; 8·8, 9 : 248°·8 : 1″·8.

Σ 2153. xvii^h 15^m·9, N. 49° 23′ : 8·6, 9·1 : 281°·8 : 1″·9.

ρ (Σ 2161). xvii^h 20^m·9, N. 37° 13′ : 4, 5·1 : 307°·2 : 3″·6 : grn. w., grnsh. Fox, '07 : 312°·6. W., blsh., '50. OΣ 329 rej. *sf*: 5·8, 8·5. Es., 12°·7 : 32″·4, *comes* 12 : 126°·6 : 46″·6.

Σ 2162. xvii^h 21^m·1, N. 36° 32′ : 8·5, 8·9 : 277°·7 : 1″·3.

Σ 2164. xvii^h 21^m·6, N. 47° 21′ : 7·8, 9·3 : 16°·5 : 8″·8. Fr., '15 : 9°·8 : 9″·8.

Σ 2165. xvii^{h} 23^{m}·8, N. 29° 32′: 7, 8·5: 45°·7: 6″·7: ysh., ash. Fr., '15: 54°·6: 8″·4. Glasenapp, *comes* 8·8 (Fr., 9·5): 251°·7: 98″·1.

Σ 2168. xvii^{h} 23^{m}·8, N. 35° 50′: 7·5, 8·2: 199°·7: 2″·4.

Σ 2178. xvii^{h} 26^{m}·6, N. 35° 0′: 7, 8·6: 130°·1: 10″·6: ysh., blsh.

λ. xvii^{h} 27^{m}·5, N. 26° 10′: 4·5: deep, dull, or., curious col. Towards this point, the solar system, according to H. and Ar. is moving. L. Struve, places the point at xvii^{h} 47^{m} + 31°. Fr., small pair *sp*: 11, 10: est. 90°: 5″.

Σ 2182. xvii^{h} 29^{m}·3, N. 23° 55′: 8·2, 9·2: 0°·9: 5″·3.

Σ 2190. xvii^{h} 32^{m}·6, N. 21° 2′: 6, 9·5: 23°·7: 10″·2: blsh. w., o.

Σ 2194. xvii^{h} 37^{m}·8, N. 24° 33′: 6·2, 8·5: 9°·4: 16″·1: y., ash. Orange, bl., '50. Fr., y., lilac, '15. Good low-powered field *f*.

Σ 2214. xvii^{h} 40^{m}·1, N. 43° 47′: 8·5, 8·8: 211°·7: 19″·4. De., trip. 9·5, 11: 143°·3: 1″·5.

Σ 2213. xvii^{h} 41^{m}·8, N. 31° 10′: 7·5, 8: 332°·3: 4″·3.

OΣ 335. xvii^{h} 42^{m}·5, N. 21° 56′: 7·3, 8·3: 140°·3: 25″.

μ (Σ 2220). xvii^{h} 43^{m}·4, N. 27° 47′: 3·8, 9·5: 241°·3: 29″·9: y., o. Do., '03: 244°·6: 32″·2. Clear y., bl., '50. A.C. doubled 9·5. Rapid bin. Lewis, 43·5 years. Greatest dist. 1″·7 at 66° (1904) closing to 0″·6 (1915) at 160°, widening to 1″ (1922) at 240°, and again closing to 0″·5 (1931) at 320°, then widening to greatest dist. A., '12: 113°·8: 0″·7.

Σ 2215. xvii^{h} 43^{m}·6, N. 17° 43′: 5·9, 7·9: 310°·6: 0″·7: w., ash. Bowyer, '11: 288°·2: 0″·6. Bin. 1^{m} 26^{s} *p* is Σ 2205: 8·3, 8·7: 291°: 2″·5. Greenw., '11: 309°·1: 1″·9.

OΣ 336. xvii^h 45^m·0, N. 34° 18′: De., 6·3, 10·3: 164°·9: 43″·2: y., o. β, *comes*: 12·5: 343°·6: 5″·6.

Σ 2232. xvii^h 47^m·0, N. 25° 18′: 7, 8·5: 142°·9: 6″·5. w., blsh.

Σ 2239. xvii^h 48^m·6, N. 28° 15′: 8·5, 9: 318°·3: 2″·2.

Σ 2242. xvii^h 48^m·8, N. 44° 55′: 7·8, 7·8: 327°: 3″·5.

Σ 2243. xvii^h 50^m·5, N. 36° 6′: 8·3, 8·8: 46°·7: 1″·7: y.

90 (β 130). xvii^h 50^m·7, N. 40° 1′: De., 5·8, 9·2: 123°: 1″·8: gold, azure.

Σ 2245. xvii^h 52^m·9, N. 18° 20′: 7, 7: 295°: 2″·6.

Σ 2246. xvii^h 52^m·9, N. 39° 30′: 8·3, 8·8: 102°·5: 5″·5. 0^m·3 *f*, 4′ *s* is β 417: 8, 9·5: De., 270°: 1″·5.

Σ 2258. xvii^h 54^m·6, N. 48° 38′: 8·5, 8·7: 221°·4: 2″·6.

Σ 2259. xvii^h 56^m·0, N. 30° 3′: 7, 8: 278°·6: 19″·4: y., bl.

Σ 2247. xvii^h 56^m·3, N. 29° 30′: 8·5, 9: 191°·2: 11″·4.

Σ 2263. xvii^h 57^m·7, N. 26° 33′: 8·2, 9·2: 161°·8: 7″·3.

95 (Σ 2264). xvii^h 58^m·4, N. 21° 36′: 4·9, 4·9: 261°·7: 6″·1: grnsh. y., redsh. y., Sm., apple green, cherry red; so to me, and *f* star a little brighter than *p*, '50, '55. Se., red the larger, grn. the brighter. Strange discrepancies as to col., P. Sm., tints var. Lewis, at present both yellow, yet Vogel, one sirian and the other solar type. Fixed. Fr., grnsh. w., ruddy w., '15.

Ho. 76. xvii^h 58^m·7, N. 33° 20′: 6, 13: 202°·4: 13″·3.

Σ 2267. xvii^h 59^m·1, N. 40° 11′: 8, 8: (244°·2): 1″·4.

Σ 2268. xviii^h 0^m·0, N. 25° 22′: 8, 9: 218°·2: 18″·1. Fr., '15: 209°·8: 21″. β, *comes* 13: 194°·6: 11″·2.

Σ 2277. xviii^h 1^m·6, N. 48° 28′: 6·3, 8·2: 117°·9: 27″·6. Fr., '15: 121°·3.

OΣ 341. xviii^h 2^m·4, N. 21° 26′: 6·4, 7·7: 93°·4: 0″·5; Bin. Major axis in line of sight, A., single, '98: 0″·5, '10. 50^s *p* is OΣ 534: 272°·8: 2″·1.

Σ 2282. xviii^h 3^m·9, N. 40° 21′ : 7·2, 8·2 : 93°·2 : 2″·4.

99 (A.C. 15). xviii^h 4^m·0, N. 30° 33′ : *β*, 6, 10·7 : 24°·4 : 1″ : '78 : 334°·2 : 1″·4, '05. Bin. Lohse, 53·51 yrs.

100 (*Σ* 2280). xviii^h 4^m·6, N. 26° 5′ : 5·9, 5·9 : 182°·9 : 13″·8 : grnsh. w. Blsh. w., '50 ; angle reversed, '55, and two faint *comites* ; so Hunt. Fr., '15, w., flushed w.

Σ 2289. xviii^h 6^m·6, N. 16° 27′ : 6, 7·1 : 243°·1 : 1″·2 : ysh., blsh. Greenw., '11 : 227°·9.

Σ 2291. xviii^h 7^m·3, N. 34° 0′ : 8·5, 9 : 339°·2 : 25″·1. Motherwell, '08 : 27″·2.

Ho. 82. xviii^h 8^m·8, N. 33° 25′ : 6, 10 : 207°·1 : 0″·5.

Σ 2292. xviii^h 8^m·9, N. 27° 37′ : 8, 8·1 : 261°·2 : 1″·4.

O*Σ* 346. xviii^h 12^m·0, N. 19° 45′ : 7·5, 8·3 : 327°·7 : 5″·5.

Σ 2301. xviii^h 12^m·5, N. 23° 58′ : 8·5, 9 : 122°·6 : 22″·7 : ysh., blsh.

Σ 2309. xviii^h 16^m·9, N. 25° 30′ : 8·5, 9 : 354°·7 : 3″·5.

Σ 2319. xviii^h 24^m·2, N. 19° 14′ : 7·2, 7·6 : 191° : 5″·6. A 10 m^g. : 279° : 38″·4. *β*, '05 : 274°·4 : 39″·8.

Σ 2320. xviii^h 24^m·5, N. 24° 38′ : 7·1, 9 : 11°·4 : 1″·8 : v.w., ash.

Σ 2330. xviii^h 27^m·5, N. 13° 7′ : 7·3, 9 : 176°·9 : 20″·3. Fr., '14 : 171°·5 : 18″·1.

Σ 2339. xviii^h 30^m·2, N. 17° 40′ : 7·2, 8 : 271°·5 : 2″·3 : w., bl. Hu. divides 7·2 : 8·0, 8·2 : 86°·3 : 0″·2.

O*Σ* 359. xviii^h 32^m·2, N. 23° 33′ : 6·6, 6·9 : 348°·2 : 0″·6. Bowyer, '11 : 332°·3 : 0″·3.

O*Σ* 358. xviii^h 32^m·3, N. 16° 55′ : 6·8, 7·2 (vars. ?) : 202°·1 : 1″·8 : ysh. Greenw., '11 : 239°·9 : 0″·3.

Σ 2360. xviii^h 35^m·9, N. 20° 52′ : 7·5, 8·7 : 5°·7 : 2″·3 : w., ash.

Σ 2371. xviii^h 39^m·0, N. 27° 34′ : 8·5, 8·5 : 55°·5 : 9″·6.

110 (h. 2839). xviii^h 42^m·2, N. 20° 28° : 5, 11 : *β*, 85°·6 :

61″·2. Pretty steady, 5½-in. '62. Wa., 5 *comites*. β, 3 nearer than 11.

Σ 2401. xviii^{h} 45^{m}·5, N. 21° 5′: 7, 8·6: 37°·6: 4″·1: w., blsh.

Σ 2415. xviii^{h} 51^{m}·1, N. 20° 31′: 6·6, 8·5: 298°·7: 2″. ysh., blsh.

113 (β 646). xviii^{h} 51^{m}·4, N. 22° 33′: 6: double *comes* at 34°: 35″·5; 12·5, 12·5: 159°·2: 7″.

Ho. 91. xviii^{h} 54^{m}·7, N. 17° 15′: 6, 11·7: 132°·5: 6″·3.

Stars with Remarkable Spectra, and Variables.

α and 68. See under Double Stars.

ST (var.). xv^{h} 48^{m}·4, N. 48° 45′: 7·4–8·1: Müller and Kemf.

X (var.). xv^{h} 0^{m}·3, N. 47° 27′: 6–7·2: Gore.

RR (var.). xvi^{h} 2^{m}·0, N. 50° 43′: 7·8–9·5: Es.

R (var.). xvi^{h} 2^{m}·6, N. 18° 35′: 8·6–14·8: 317^{d}·7: Bonn.

RU (var.). xvi^{h} 6^{m}·8, N. 25° 17′: 7·3–14·2: 486^{d}: Anderson.

U (var.). xvi^{h} 22^{m}·2, N. 19° 4′: 6·4–12: 403°: Hencke.

30 (var.). xvi^{h} 26^{m}·0, N. 42° 3′: 4·7–6: Baxendell.

W (var.). xvi^{h} 32^{m}·4, N. 37° 30′: 7·8–13·5: 280^{d}·2: Du.

S (var.). xvi^{h} 48^{m}·3, N. 15° 5′: 7·3–12·6: 308^{d}·3: Bonn.

Es.-Birm. 482*a*. xvii^{h} 7^{m}·8, N. 40° 44′: 7·7: III: Es.

Es.-Birm. 485. xvii^{h} 14^{m}·6, N. 31° 31′: 8·5: R: Burton.

RS (var.). xvii^{h} 18^{m}·4, N. 23° 0′; 8–12·5: 223^{d}: Anderson.

Z (var.). xvii^{h} 54^{m}·5, N. 15° 9′: 7·1–7·9: 3^{d}·99. Algol type. Müller and Kemf.

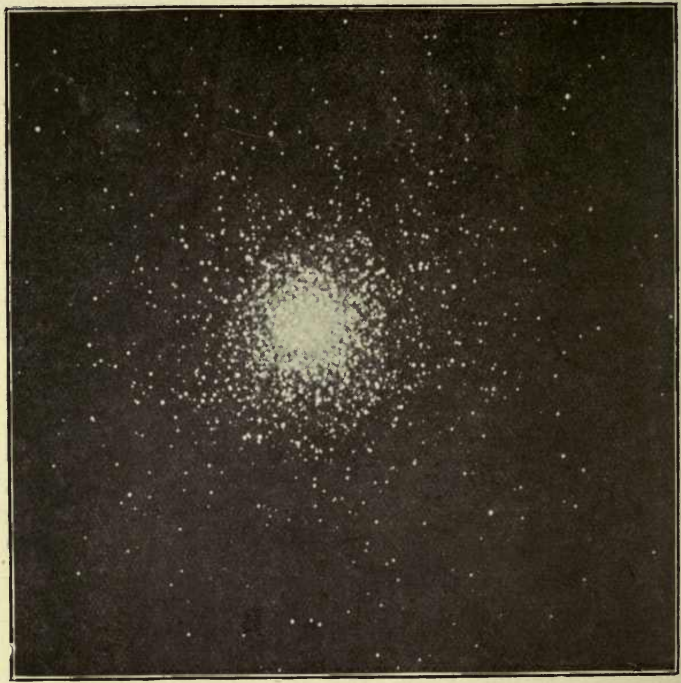
Es.-Birm. 514. xviii^{h} 4^{m}·4, N. 43° 27′: 8: III: Du.

Es.-Birm. 516*a*. xviii^{h} 5^{m}·5, N. 42° 13′: 8·9: III: Es.

T (var.). xviii^{h} 6^{m}·1, N. 31° 0′: 7·2–13·6: 165^{d}: Bonn.

Es.-Birm. 521. xviii^{h} 9^{m}·3, N. 33° 16′: 7·3: pale ruby: W. Var. ? Es.

Es.-Birm. 522. xviii^{h} 9^{m}·5, N. 22° 48′: 7·5: R: B. Var. ? Es.



THE STAR CLUSTER, M. 13, HERCULIS.

Photographed at the Lick Observatory.

RX (var.). XVIII$^{\text{h}}$ 26$^{\text{m}}$·9, N. 12° 33′: 7–7·6: 0$^{\text{d}}$·89: Algol type. Sawyer.

CLUSTERS, NEBULÆ, AND GROUPS.

Recurved line of small stars proceeding from 7·5 m$^{\text{g}}$. ± XVI$^{\text{h}}$ 33$^{\text{m}}$·7, N. 31° 6′.[1]

6205 (M. 13). XVI$^{\text{h}}$ 38$^{\text{m}}$·8, N. 36° 36′. Superb globular cl., lying $\frac{1}{3}$ from η towards ζ, finest of its class; just visible to naked eye. Halley discovered it in 1714; M. was *sure* it contained *no stars;* but it is spangled with glittering points in a 5½-ft. achromatic, and becomes a superb object in large telescopes. h. speaks of thousands of stars, 10 or 11 to 15 or 20 m$^{\text{g}}$.; his father had estimated them at 14,000. Sm. calls it an extensive and magnificent mass of stars, with the most compressed part densely compacted and wedged together under unknown laws of aggregation. h. describes 'hairy-looking curvilinear branches,' well seen with 8-in. 'With' mirror; E. of Rosse, who noticed this spiral tendency, detected also three dark 'lanes' or rifts in its interior, beautifully seen by Buffham with 9-in. 'With' mirror. I have also perceived them. Huggins finds spectrum continuous, but red end wanting (see M. 31, And., and H. IV 26, Erid, *antea*). In Se.'s achr. the outliers, inconspicuous in ordinary instruments, fill a field of 8′. Ranyard, from an examination of the Lick photos., finds several prominence-like structures, composed of nebulous matter, and stars. Burnham sees a solitary close double star (0″·9) near the centre, and notes that in all bright compressed clusters there seems to be a remarkable absence of close double stars. Klein has well remarked that our understanding strives in vain to answer the inquiry, What is the object of these thousands on thousands suns? The mere aspect of this stupendous aggregation is indeed enough to make the mind shrink with a sense of the insignificance of our little world. Yet the Christian will not forget that, as it has been nobly said, HE took of the dust of this Earth, and with it HE rules the universe!

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[1] This is a specimen of a peculiarly interesting, but hitherto little noticed, class of objects to which the persevering student may make large and very curious additions, with an increasing conviction as to their mutual interdependence.

Two stars are var. In some cl. numbers are var. and have periods of 0·4 to 0·7 of a day with a prolonged halt at min. and a var. of one magnitude. These objects are known as cluster vars.

The neighbourhood is beautiful with a low power. A faint neb., ± 40′ *nf.* A reddish 7·7 m^{g}. star 1^{m} 27^{s} *f*, 3′ *n*, noted by D'A. as having a fine III Type spectrum, was found by Dunér to have changed to a continuous spectrum, or possibly Type II. The star is probably var., and should be watched, as there is a similar change in R Scuti.

6210 (Σ 5 N). xvi^{h} 41^{m}·6, N. 23° 57′. Plan. neb., 8″ diam.; discovered by Σ. Very bright. D'A. = 8 m^{g}.; small, not sharply defined; exactly like a star out of focus, bearing power well. 111 of 5$\frac{1}{2}$-in. showed a glow round it. E. of Rosse, intense bl. Se. thought it resolved with a power of 1500; but the spectroscope shows it gaseous. Rather more than 1° *sp* 51, 5 m^{g}.

6229 (H. IV 50). xvi^{h} 44^{m}·7, N. 47° 40′. Plan. neb., faint with 3$\frac{7}{10}$-in., but beautifully grouped in a triangle with two 6 m^{g}. stars. D'A., very crowded cl.

6341 (M. 92). xvii^{h} 14^{m}·7, N. 43° 14′. Very fine cl., though not equal to M. 13; less resolvable; intensely bright in centre. D.'A. justly calls it, with his 11-in. achr. at Copenhagen, *acervus adspectu jucundissimus.* In H.'s reflectors, 7′ or 8′ diam. Buffham, with 9-in. spec., found stars brighter and more compressed than in M. 13, but blaze resolved by glimpses. Spectrum as M. 13. E. of Rosse, possibly spiral, nucleus barely, if at all, resolved.

Wreath of stars 11 m^{g}., attached to 8·5 m^{g}., ± xviii^{h} 59^{m}·2, N. 26° 24′.

Group. ± xviii^{h} 0^{m}, N. 19° 33′: three stars in line, 8, 7, 8: w., w., pale red; *nf* of which is a fainter group with similar line of stars 10 m^{g}.

Double chain of stars, 9 m^{g}., ± xviii^{h} 7^{m}, N. 23° 45′.

III. xviii^{h} 43^{m}·1, N. 18° 3′. Has an interesting large field *n*, including bright or. star, B. A pair 11 m^{g}. *sp*, another 6·4, 9·2, 1^{m} *p*, 18′ *n*.

HYDRA.

A very lengthy and not very interesting constellation to the unaided eye; but containing some telescopic work.

Double Stars.

Σ 1198. viii^{h} 7^{m}·1, N. 1° 30′: 8, 8·2: 157°·5: 33″.

Σ 1245. viii^{h} 31^{m}·6, N. 6° 54′: 6, 7: 25°·4: 10″·3: ysh., y.r. Fr., pale y., purple. Finely grouped with other stars; 1° *np* δ.

Σ 1255. viii^{h} 35^{m}·5, N. 6° 4′: 7, 8: 31°·1: 26″·6.

Σ 1260. viii^{h} 36^{m}·9, S. 11° 53′: 7·8, 8·3: 301°·4: 4″·9.

Σ 1270. viii^{h} 41^{m}·3, N. 2° 19′: 6·6, 7·6: 259°·1: 4″·7: y.w., blsh.

ϵ (*Σ* 1273). viii^{h} 42^{m}·5, N. 6° 43′: 3·8, 7·8: 195°·6: 3″·2: y., bl. Bowyer, '12: 240°·2. *Comes* ruddy, '51. Hall and β, very minute *comes*. 192°·2: 20″·5, same p.m. Schi. divided 3·8 into 4½, 5: 142°: 0″·2. Rapid bin. A., 15·3 years, probably never wider than 0″·3. Spect. bin. with similar period. A remarkable system.

β 586. VIII^{h} 43^{m}·2, S. 16° 46′ : 6·5, 9 : 53°·2 : 0″·7.

Σ 1281. VIII^{h} 43^{m}·5, N. 0° 17′ : 7·8, 8·9 : 329°·6 : 25″. β, ’03 : 318°·9 : 35″·4.

ρ (A.C.C. 3). VIII^{h} 44^{m}·2, N. 6° 8′ : β, 5, 12·5 : 144°·9 : 12″·4.

15 (β 587). VIII^{h} 47^{m}·6, S. 6° 52′ : 6, 9 : 165°·1 : 0″·5. Doo., ’03 : 141°·1 : 0″·8. Bin. ? Two distant *comites*.

OΣ 195. VIII^{h} 49^{m}·7, N. 8° 43′ : 7·4, 7·9 : 138°·9 : 9″·5.

Σ 1292. VIII^{h} 49^{m}·7, S. 0° 17′ : 8·8, 9 : 188°·8 : 5″·8.

17 (Σ 1295). VIII^{h} 51^{m}·6, S. 7° 40′ : 7·2, 7·3 : 358°·8 : 4″·3. *s* star the largest, ’51. β 103 : 8, 11·2 : Doo., ’05 : 68°·4 : 3″·1, is 35^{s} *p*, 9′ *s*.

β 210. VIII^{h} 53^{m}·1, S. 17° 7′ : De., 7, 7·4 : 181°·6 : 2″·4.

Σ 1302. VIII^{h} 57^{m}·1, N. 3° 4′ : 8·7, 8·8 : 228°·1 : 2″·4. β, ’04 : 234° : *comes* 12 : 267°·6 : 32″·1. 45^{s} *f*, 2′ *s*, is β 211 : 7·5, 10 : 257°·7 : 1″·1.

Σ 1309. IX^{h} 2^{m}·5, N. 3° 9′ : 8, 8·3 : 273°·1 : 11″·3. 2^{m} 52^{s} *f*, 7′ *n*, is OΣ 197 : 7·4, 9 : 60°·8 : 1″·5.

β 336. IX^{h} 8^{m}·5, S. 16° 29′ : 8, 9 : De., 238°·3 : 1″·9.

θ (H*h*. 322). IX^{h} 10^{m}·2, N. 2° 38′ : 5, 10·8 : β, ’02 : 179°·7 : 45″·3. 10·8 not seen, $3\frac{7}{10}$-in. achr.

Σ 1329. IX^{h} 11^{m}·7, S. 0° 53′ : 8·3, 8·5 : 245°·7 : 27″·2. β., ’03 : 250°·3 : 19″·9.

β 212. IX^{h} 12^{m}·1, S. 8° 1′ : 7, 9 : Du., 230°·5 : 1″·5. Bies., ’03 : 220°·2.

β 588. IX^{h} 12^{m}·6, N. 1° 5′ : 6½, 11 : 123°·2 : 2″·4.

Σ 1343. IX^{h} 15^{m}·8, N. 5° 21′ : 8·7, 9·2 : 271° : 10″.

Σ 1347. IX^{h} 19^{m}·1, N. 3° 51′ : 6·7, 8 : 310°·5 : 21″·3 : w. Rsh. w., grey or blsh. ’51. Fr., ysh. w., bl., ’15.

Σ 1348. IX^{h} 20^{m}·3, N. 6° 42′ : 7·5, 7·6 : 334°·3 : 1″·1. Greenw., ’12 : 318°·7 : 1″·8.

29 (β 590). IX^{h} 23^{m}·4, S. 8° 52′ : 6·7, 11·7 : 176°·8 : 10″·8. A. divides 6·7 : 7·2, 7·2 : 182°·8 : 0″·2.

τ^{1} (H*h*. 333). IX^{h} 25^{m}·1, S. 2° 25′ : Sm., 5·5, 8·5 : 64°·9 : 2″·9 : pale w., dusky. Greenish y., lilac, '51.

β 339. IX^{h} 27^{m}·2, S. 15° 23′ : 8, 9·5 : De., 215°·8 : 1″·3.

Σ 1365. IX^{h} 27^{m}·4, N. 1° 50′ : 7, 8 : 162°·8 : 3″·1 : ysh., w.

Σ 1416. X^{h} 8^{m}·4, S. 15° 42′ : 6·7, 8·5 : 275°·8 : 11″·3. Fr. and Lewis, 6·7 only 7·5.

Holden 101. X^{h} 13^{m}·0, S. 20° 16′ : 6, 9·8 : 113°·8 : 1″·5.

44 (β 1269). X^{h} 30^{m}·2, S. 23° 20′ : 5, 14 : 63°·8 : 18″·3.

ϕ^{2} (β 1075). X^{h} 32^{m}·4, S. 15° 56′ : 6, 13 : 277°·1 : 3″.

Σ 1473. X^{h} 43^{m}·7, S. 15° 12′ : 8, 8·9 : 10°·1 : 30″·7. 21′ *n* is Σ 1474 : 6·9, 8 : 22°·2 : 71″·7. Fr., '16 : 69″·5. *Comes* to 8, 8 : 193°·9 : 6″·6. 18′ *np* is β 595 : 9, 11 : 14°·6 : 2″·3.

I 871. XI^{h} 4^{m}·4, S. 29° 32′ : 6·4, 10·9 : 310° ± : 2″ ± .

Jacob 6. XI^{h} 25^{m}·7, S. 24° 1′ : 5½, 7½ : 76°·8 : 8″·1.

H*h*. 376. XI^{h} 28^{m}·3, S. 28° 49′ : 6, 6 : Morton, 211°·4 : 8″·8. ½ m^{g}. diff., '52. c.p.m.

See 150. XII^{h} 19^{m}·6, S. 29° 53′ : 13·5 : 102°·5 : 17″·9.

h. 4554. XII^{h} 47^{m}·4, S. 30° 38′ : 6, 10 : 28° : 18″.

β 1246. XIV^{h} 14^{m}·5, S. 25° 27′ : 5·5, 13·3 : 187°·1 : 3″.

52 (β 940). XIV^{h} 23^{m}·5, S. 29° 8′ : 5, 11·3 : 276°·8 : 4″.

β 1112. XIV^{h} 28^{m}·4, S. 30° 22′ : 6·3, 11·1 : 7°·6 : 2″·4.

β 414. XIV^{h} 37^{m}·1, S. 30° 35′ : 6·5, 7·9 : 345°·6 : 1″.

54 (H*h*. 449). XIV^{h} 41^{m}·4, S. 25° 6′ : Wilson, 6, 7·5 : 129°·2 : 9″.

59 (β 239). XIV^{h} 53^{m}·9, S. 27° 20′ : 6, 6 : 123°·7 : 0″·9. Doo., '08 : 321°·0 : 1″.

STARS WITH REMARKABLE SPECTRA, AND VARIABLES.

Es.-Birm. 264*a*. VIII^{h} 15^{m}·9, N. 3° 1′ : 8·3 : IV : Es. Var., Backhouse.

RT (var.). VIII^{h} 25^{m}·7, S. 6° 3′ : 7·4–9·8 : Har.

RV (var.). VIII^h 35^m·9, S. 9° 18′ : 7·9–9 : Har.
S (var.). VIII^h 49^m·4, N. 3° 22′ : 7·5–13 : 256^d : Hind.
T (var.). VIII^h 51^m·8, S. 8° 50′ : 7–13·1 : 288^d·8 : Hind.
Es.-Birm. 293. IX^h 16^m·5, N. 0° 31′ : 7·5 : III : D'A. Var. ?, 8·3, bl. near, Es.
a (Cor. Hydræ). IX^h 23^m·6, S. 8° 19′ : var. ? II.
Star. IX^h 37^m·6, S. 23° 13′ : 4·7 : Hy. : Har.
Y (var.). IX^h 47^m·4, S. 22° 38′ : 6·6 : IV : Se.
U (var.). X^h 33^m·6, S. 12° 58′ : 4·5–6·3 : Gould. IV.
V (var.). X^h 47^m·7, S. 20° 50′ : 7–10 : Gould. IV.
R (var.). XIII^h 25^m·3, S. 22° 52′ : 4–9·8 : 425^d·1 : Montanari.
W (var.). XIII^h 44^m·5, S. 27° 58′ : 6·7–8 : 384^d : Har.
RU (var.). XIV^h 7^m·1, S. 28° 30′ : 7·5–12·5 : 332^d·3. Cape.

NEBULÆ AND CLUSTER.

3242 (H. IV 27). X^h 20^m·9, S. 18° 14′. Plan. neb. 2° *s* of μ, resembling Jupiter, Sm. says, in size, equable light, and col. I found it bright ; a little elliptical *np*, *sf*, of a steady pale bl. light, bearing high powers. H. did not resolve it. Se., whose beautifully defining glass accomplished marvels, with 1000, found it a unique object ; within a circular nebulosity two clusters, connected by two semicircular arches of stars, forming a sparkling ring, with one star on the hazy ground of the centre. D'A. made out two nuclei near the limb. Huggins sees an oval ring surrounded by broad faint nebulosity ; but its spectrum is that of gas, and the bright points can hardly be solid matter. L.P. shows nucleus and two rings.

4590 (M. 68). XII^h 35^m·3, S. 26° 19′. Globular cl. of stars, well resolved ; 12 m^g. stars, one red.

5061 (H. I 138). XIII^h 13^m·7, S. 26° 19′. Very bright, small, round, nucleus, 10 m^g.

LACERTA.

A small and distinctly marked asterism. Glorious sweeping from Cygnus in this direction, and towards head of Cepheus.

Double Stars.

Ho. 177. XXI^{h} 58^{m}·8, N. 36° 35′ : 6·5, 13 : 110°·2 : 8″·1.

β 694. XXI^{h} 59^{m}·7, N. 44° 15′ : 6, 8·5 : 352°·3 : 0″·5. Two *comites*.

Σ 2876. XXII^{h} 8^{m}·5, N. 37° 16′ : 7·7, 9·2 : 68°·4 : 11″·8.

Σ 2882. XXII^{h} 10^{m}·8, N. 37° 21′ : 9·2, 9·2 : 326°·5 : 3″·2.

Σ 2890. XXII^{h} 12^{m}·0, N. 49° 29′ : 8·5, 8·7 : 11°·7 : 9″·1.

Σ 2891. XXII^{h} 13^{m}·2, N. 47° 35′ : 8·2, 9·2 : 309°·2 : 12″·4.

Σ 2894. XXII^{h} 15^{m}·4, N. 37° 22′ : 6, 8·2 : 193°·5 : 15″·3 : w., ash. W., bl., '50. *β*, dist. *comes*, 12·5.

O*Σ* 469. XXII^{h} 17^{m}·0, N. 34° 43′ : 7·2, 8·8 : 280°·6 : 31″·8. Fr., '14 : 285°·5 : 29″·9.

Σ 2902. XXII^{h} 20^{m}·2, N. 44° 57′ : 7·1, 8 : 89°·9 : 6″·4.

Σ 2917. XXII^{h} 27^{m}·4, N. 53° 5′ : 8, 8 : 71°·2 : 4″·7.

Σ 2916. XXII^{h} 27^{m}·8, N. 40° 48′ : 7·3, 8·8 : 335°·3 : 45″·2 : y., o. 8·8 has *comes*, 10·2 : 30°·6 : 3″·5. Es., another 13·6 : 118° : 16″·6.

8 (*Σ* 2922). XXII^{h} 32^{m}·3, N. 39° 13′ : 6, 6·5 : 10·2, 8·5 : AB, 185°·7 : 22″·5. BC, 155°·7 : 28″·2 ; BD, 131°·6 : 66″·5. First two w., perhaps tinged with y., 10·2 uncertain, 8·5 bl. A. adds 14·2 to C : 257°·8 : 1″·5 ; Es. adds 14 to D : 224°·7 : 9″·4, and notes a pair (13, 13·5 : 85° : 10″) at 230°, 45″ from C. 6 has bright hyd. lines.

Σ 2926. XXII^{h} 33^{m}·9, N. 38° 29′ : 8·5, 8·5 : 336°·1 : 20″·8.

Ho. 187. XXII^{h} 35^{m}·9, N. 37° 19′ : 6, 12·9 : 286°·3 : 18″·3.

13 (h. 1803). XXII^{h} 40^{m}·5, N. 41° 24′ : OΣ, 5·4, 10·8 : 129°·9 : 14″·8.

Σ 2942. XXII^{h} 40^{m}·5, N. 39° 3′ : 7, 9·2 : 282°·1 : 2″·7 : rsh. gold, ash. β, *comes* 12 : 232° : 10″·9.

Σ 2946. XXII^{h} 46^{m}·2, N. 40° 6′ : 8, 8 : 253°·1 : 5″.

h. 1823. XXII^{h} 48^{m}·2, N. 40° 53′ : 6·3, 7·3 : 338°·3 : 82″. 6·3 has *comes* 12 : 257°·8 : 19″, and 7·3 *comes* 11 : β, 139°·2 : 4″·8.

β 382. XXII^{h} 50^{m}·5, N. 44° 20′ : 6, 7·9 : 205°·7 : 1″·1. Chapman, '11 : 236°·6 : 0″·9. A., 10·7 : 353°·6 : 26″·4.

Pair. XXII^{h} 52^{m}·0, N. 35° 55′ : Es., 6·0, 8·5 : 243° : 49″·6.

Stars with Remarkable Spectra, and Variables.

S (var.). XXII^{h} 25^{m}·5, N. 39° 54′ : 8–12·5 : 237^{d}·5 : Har.

Nova. XXII^{h} 32^{m}·6, N. 52° 18′ : 5–13·5 : Disc., 1910, when on the wane. Spect. at Har. showed eleven bright lines. 1912 it had become a plan. neb. 1913, sp. apparently continuous.

R (var.). XXII^{h} 39^{m}·7, N. 41° 57′ : 8·3–14·5 : 299^{d}·8 : Deichmüller.

U (var.). XXII^{h} 45^{m}·3, N. 54° 42′ : 8·5–9·5 ? : III : Es.

Clusters.

7243 (H. VIII 75). XXII^{h} 12^{m}·0, N. 49° 29′. Fine cl. quickly followed by beautiful field with three pairs.

Fine field. XXII^{h} 15^{m}·8, N. 45° 35′.

β. XXII^{h} 20^{m}·4, N. 51° 51′, in a glorious field. Es.

α. XXII^{h} 28^{m}·0, N. 49° 52′, points out a noble field. 5, a 5 m^{g}. star, $2\frac{1}{2}$° *sp*, is a fine object, deep orange, with blue attendant in rich vicinity.

LEO.

A fine constellation, the fore part of which is marked to the naked eye by a *sickle* of conspicuous stars. At the bottom of the handle, and very nearly in the pathway of the sun, is the leader, Regulus, the Lion's Heart.

Double Stars.

Σ 1332. IX^{h} 12^{m}·7, N. 23° 59′ : 7·2, 7·5 : 16°·3 : 5″·6.

κ (*β* 105). IX^{h} 20^{m}·0, N. 26° 32′ : De., 4·9, 10·5 : 203°·8 : 3″ : y., bl.

Σ 1353. IX^{h} 23^{m}·3, N. 16° 6′ : 8·5, 8·8 : 314°·7 : 3″·1.

Σ 1355. IX^{h} 23^{m}·6, N. 6° 36′ : 7·2, 7·2 : 328°·3 : 2″·8. Greenw., '12 : 336°·5.

ω (*Σ* 1356). IX^{h} 24^{m}·2, N. 9° 25′ : 6·2, 7 : 153°·9 : 1″ : y., '25. Ph., '14 : 122°·9 : 1″·1. Bin. Per. 116 years; See. Greatest separation, 1″·1, at 132°; least, 0″·2, at 237°.

Σ 1360. IX^{h} 26^{m}·3, N. 10° 58′ : 7·4, 7·7 : 243° : 14″·3.

Σ 1364. IX^{h} 27^{m}·3, N. 20° 22′ : 7·7, 9·2 : 156°·1 : (16″·4).

6 (O*ΣΣ* 101). IX^{h} 27^{m}·7, N. 10° 5′ : De., 5, 9·5 : 74°·5 : 37″ : gold, azure. Deep or., grn., $3\frac{7}{10}$-in., '51 ; 9·5, lilac, 5½-in., '62 ; pale or., bl., '82. Fr., pale or., purp., '77.

O*Σ* 204. IX^{h} 34^{m}·5, N. 11° 8′ : 6·5, 10·5 : 104°·9 : 8″·4.

Σ 1389. IX^{h} 47^{m}·8, N. 27° 22′ : 8, 9 : 329°·2 : 1″·7 : ysh. Bowyer, '03 : 311°·8 : 2″·2.

Σ 1399. IX^{h} 52^{m}·7, N. 20° 9′ : 6·8, 7·8 : 175°·1 : 30″·1 : w. Fr., '15 : w., blsh.

31 (Anderson). X^{h} 3^{m}·7, N. 10° 23′ : *β*, 5, 13½ : 44°·2 : 7″·6.

α (*Σ* II 6). X^{h} 4^{m}·1, N. 12° 21′ : 1·5, 8·4 : 306°·6 : 176″·9, Winlock, *comes* double, *β*, 12·5 ; 83°·6 : 2″·7, moving with 1·5. Doo. rates *comes* 13·5 m^{s}.

Σ 1413. x$^{\text{h}}$ 8$^{\text{m}}$·0, N. 16° 44′ : 8·9, 8·9 : 278°·5 : 2″·4.

Σ 1417. x$^{\text{h}}$ 10$^{\text{m}}$·8, N. 19° 31′ : 8·2, 8·2 : 261°·4 : 2″·4.

ζ (Σ I 18). x$^{\text{h}}$ 12$^{\text{m}}$·2, N. 23° 49′ : 3·8, 6 : 343°·1 : 314″·4 : y., w. Separating from p.m. of 6.

Σ 1419. x$^{\text{h}}$ 12$^{\text{m}}$·8, N. 10° 31′ : 8·4, 9·1 : 223°·9 : 4″·4 : w., blsh.

39 (OΣ 523). x$^{\text{h}}$ 12$^{\text{m}}$·9, N. 23° 30′ : 5·8, 11·4 : 296°·4 : 6″·6 : y., o. c.p.m.

γ (Σ 1424). x$^{\text{h}}$ 15$^{\text{m}}$·5, N. 20° 15′ : 2, 3·5 : 103°·4 : 2″·5 : gold, grnsh. red. Ph., '14 : 117°·4 : 3″·7. Y., grnsh. y., '49 ; y., deeper y., '60. Very fine object. The two stars are moving, one 0″·322 towards 115°, the other 0″·340 towards 116°·4, without sign so far of orbital motion. Schm. thinks the neighbour, 40, var. ; so Fr. Not in Ar.

Σ 1426. x$^{\text{h}}$ 16$^{\text{m}}$·3, N. 6° 50′ : 7·8, 8·3 : 256°·7 : 0″·6 : ysh. Bowyer, '12 : 290°. A 9·3 : 9°·1 : 7″·4.

OΣ 216. x$^{\text{h}}$ 18$^{\text{m}}$·5, N. 15° 45′ : 7·0, 10·5 : 167°·9 : 2″·1 : '45. A., '12 : 95°·8 : 1″·1. Bin.

Σ 1429. x$^{\text{h}}$ 20$^{\text{m}}$·6, N. 25° 2′ : 8·3, 8·3 : 270°·6 : 1″·5. Bowyer, '12 : 243° : 0″·6.

Σ 1431. x$^{\text{h}}$ 21$^{\text{m}}$·4, N. 9° 11′ : 8, 9·7 : 65°·9 : 3″·2 : w., blsh. w. Closely *f* 44, 6 m$^{\text{g}}$. or., which is 2° *p* ρ.

Σ 1434. x$^{\text{h}}$ 22$^{\text{m}}$·8, N. 18° 29′ : 8·5, 8·5 : 269°·6 : 6″·1. Very pretty.

OΣ 220. x$^{\text{h}}$ 25$^{\text{m}}$·0, N. 10° 34′ : 7·1, 9 : 62°·3 : 1″·3.

Σ 1439. x$^{\text{h}}$ 25$^{\text{m}}$·7, N. 21° 13′ : 8, 8·5 : 131°·4 : 2″. Ph., '13 : 108°·4 : 1″·6.

Σ 1442. x$^{\text{h}}$ 27$^{\text{m}}$·6, N. 22° 27′ : 7·2, 7·8 : 155°·2 : 13″·3.

Σ 1447. x$^{\text{h}}$ 29$^{\text{m}}$·4, N. 23° 46′ : 7·1, 8·9 : 125°·2 : 4″·3 : v. w., blsh.

Σ 1448. x^{h} 30^{m}·0, N. 22° 1′ : 7, 9 : 258°·7 : 10″·9 : ysh., o.

49 (Σ 1450). x^{h} 30^{m}·9, N. 9° 4′ : 6, 8·7 : 161°·1 : 2″·4 : w., blsh.

Pair. x^{h} 31^{m}·9, N. 12° 2′ : 8, 9 : pale or., pale bl. Kn., 337° : 55″·6. β, pair, 2^{m} 35^{s} *p*, 18′ *s* : 9·5, 9·5 : 204°·3 : 2″·3.

Σ 1468. x^{h} 40^{m}·4, N. 21° 7′ : 8·7, 8·7 : 334°·6 : 3″·7.

β 596. x^{h} 45^{m}·2, N. 17° 34′ : 6·5, 13 : 277°·3 : 2″·4.

Σ 1476. x^{h} 45^{m}·2, S. 3° 36′ : 7·2, 8 : 353°·7 : 1″·9. Scott, '03 : 2°·1 : 2″·5.

Σ 1477. x^{h} 45^{m}·4, N. 13° 21′ : 8·3, 8·8 : 275°·5 : 17″·6.

Σ 1482. x^{h} 48^{m}·0, N. 7° 53′ : 8, 8·9 : 305°·3 : 11″·7.

54 (Σ 1487). x^{h} 51^{m}·3, N. 25° 10′ : 5, 7 : 102°·8 : 6″·2 : grnsh. w., bl. Bowyer, '12 : 107°·7 : 6″·7.

55 (β 1076). x^{h} 51^{m}·6, N. 1° 10′ : 5·8, 10·3 : 49°·7 : 1″. A., '99 : 31°·9 : 0″·8.

Σ 1500. x^{h} 55^{m}·9, S. 3° 3′ : 7·6, 8·2 : 331° : 1″·1 : ysh. A., '02 : 311°·8 : 1″·4.

Σ 1502. x^{h} 57^{m}·8, N. 15° 3′ : 8·5, 9·3 : 284°·5 : 12″·4. Fr., '15 : 282° : 13″·1.

Σ 1504. x^{h} 59^{m}·9, N. 4° 4′ : 7·5, 7·6 : 275°·7 : 1″·1. Furner, '11 : 288°·6.

Σ 1507. xi^{h} 2^{m}·0, N. 7° 28′ : 8·2, 10·5 : 164°·8 : 8″. 10·5 very difficult, 80 ; steady 144, 3$\frac{7}{10}$-in. ; good comparative test. Wa., 2½-in. Closely *f* χ.

65 (β 599). xi^{h} 2^{m}·8, N. 2° 23′ : 5½, 11·5 : 82°·4 : 1″·8.

A 677. xi^{h} 4^{m}·5, N. 25° 5′ : 6, 14·5 : 243°·6 : 4″·8.

δ Leonis. xi^{h} 7^{m}·8, N. 20° 58′ : β, dist. *comes*, at 350°·9, double : 9, 9·3 : 204°·3 : 0″·4.

Σ 1517. xi^{h} 9^{m}·5, N. 20° 34′ : 7·3, 7·3 : 287°·8 : 1″·1 : ysh. Bowyer, '12 : 87°·3 : 0″·3.

Σ 1527. xi^{h} 14^{m}·8, N. 14° 43′ : 6·9, 8·1 : 10°·1 : 3″·9 : v. w., blsh. Bowyer, '12 : 18°·7 : 3″·3.

Σ 1529. xi^{h} 15^{m}·3, S. 1° 12′ : 7, 8 : 250°·9 : 9″·3 : yw., ashy. A fine object.

ι (Σ 1536). xi^{h} 19^{m}·7, N. 10° 59′ : 3·9, 7·1 : 92°·4 : 2″·2 : ysh., bl. Ph., '14 : 45°·9 : 2″. Bin. Bright or., grnsh. y., '48. Just divided, 80, pale y., pale bl. or grn., '49. W., tawny, '70.

Σ 1537. xi^{h} 20^{m}·3, N. 20° 59′ : 7·6, 8·6 : 356°·4 : 2″·5 : w., ashy.

Σ 3070. xi^{h} 20^{m}·4, S. 3° 57′ : 8·8, 9·2 : 276°·3 : 8″.

83 (Σ 1540). xi^{h} 22^{m}·8, N. 3° 27′ : 6·3, 7·3 : 150° : 29″·6 : w. Y., lilac, '52 ; y., pale ruddy purple, '56. Fr., yw., ruddy, '15.

τ (Σ I 19). xi^{h} 23^{m}·8, N. 3° 18′ : 5, 7 : 169°·6 : 94″·8 : y., w. β, '04 : 174°·2 : 92″·3.

Σ 3072. xi^{h} 26^{m}·8, S. 6° 16′ : 7·4, 10·4 : 331°·8 : 9″·4.

88 (Σ 1547). xi^{h} 27^{m}·7, N. 14° 49′ : 6·4, 8·4 : 319°·9 : 15″·3 : ysh., bl. β, '04 : 325°. Fr., pale y., lilac, '15.

Σ 1548. xi^{h} 28^{m}·0, S. 3° 5′ : 7·7, 8·7 : 127°·3 : 10″·3.

90 (Σ 1552). xi^{h} 30^{m}·6, N. 17° 15′ : 6, 7·3 : 209°·4 : 3″ : w., blsh. w. a distant 9·5.

Σ 1564. xi^{h} 35^{m}·5, N. 27° 24′ : 8·2, 9 : 86°·4 : 5″·1.

Σ 1565. xi^{h} 35^{m}·5, N. 19° 27′ : 7, 8 : 304°·1 : 21″·5.

93 (Σ II 7). xi^{h} 43^{m}·9, N. 20° 40′ : 4·7, 8·4 : 355°·5 : 74″·3 : y., w. Curious field ; pair repeated. Two large groups of faint neb., one 4^{m} *fn* ; the other *sp*.

β. xi^{h} 45^{m}·0, N. 15° 2′ : Sm., 2½, 8 ; bluish, dull red. Very wide. β 603 is 19′ away, at 201°·5 : 6·4, 10·3 : 328°·7 : 1″·2. A., '12 : 311°·0 : 0″·8. β sees two *comites* to β ; A., 15·5, 13·5 : 346°·2, 351°·4 : 39″·7, 78″·9.

STARS WITH REMARKABLE SPECTRA, AND VARIABLES.

R (var.). IX^{h} 43^{m}·3, N. 11° 48′ : 4·6–10·5 : 312^{d}·8 : Koch.[1]
V (var.). IX^{h} 55^{m}·6, N. 21° 39′ : 8·6<13·5 : 273^{d}·1 : Becker.
W (var.). X^{h} 49^{m}·4, N. 14° 8′ : 9<14 : 388^{d} : Peters.
56. X^{h} 51^{m}·9, N. 6° 36′ : 6·5 : y R. : III : Vogel.
S (var.). XI^{h} 6^{m}·7, N. 5° 54′ : 9–13·5 : 189^{d}·5 : Chacornac.

NEBULÆ.

2903, 2905 (H. I 56, 57). IX^{h} 27^{m}·6, N. 21° 51′. Long, with two nuclei, rather faint. H., equal. h. and D'A., *f* very faint. E. of Rosse, oblique spiral, resolved.

3379, 3384 (H. I 17, 18). X^{h} 43^{m}·6, N. 13° 0′. Two faint neb., *p* much larger and brighter, with stellar nucleus. H., a third, making right-angled triangle. Sm., a neat little pair, *nf*, well seen 80. Among the neb., in a round patch of 2° or 3°, in a region of few stars. 1^{m} 4^{s} *p* 36′ *s* is M. 96. Very bright neb. E. of Rosse, spiral. 2^{m} 48^{s} *p* M. 96 is M. 95. E. of Rosse, two ellipses, centre resolved ?

3521 (H. I 13). XI^{h} 1^{m}·7, N. 0° 24′. Large, elongated. D'A., 6′ × 45″, with stellar nucleus. L.P., 2 neb. probably joined.

3593 (H. I 29). XI^{h} 10^{m}·4, N. 13° 15′. Bright, elongated.

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[1] Hind says, 'It is one of the most fiery-looking variables on our list—fiery in every stage, from max. to min., and is really a fine telescopic object in a dark sky, when its colour forms a striking contrast with the steady wh. light of the 6 m^{g}. a little to the *n*.' One of the finest of its most mysterious class, which deserves a special investigation, in which amateurs may do good service without costly instruments. The red hue, so conspicuous in the above specimen, prevails more or less among them ; inequality or irregularity in the times of increase and decrease is common ; and some appear hazy at *min.* Baxendell has noticed a singular tendency to collection in groups.

3599 (H. II 49). xi^{h} 11^{m}·2, N. 18° 33′. Small, round. Most remarkable if, as D'A. thinks, var. '31, brighter than H. III 27, 1^{m} 22^{s} *f*; '61, I class (so Schönfeld); '63, sometimes II, at others *invisible;* '64, not above III, and fainter than H. III 27.

3627, 3623 (M. 66, 65). xi^{h} 16^{m}·1, N. 13° 26′. Two rather faint objects, elongated visually in different directions, in a low-powered field, with several stars. *s* (M. 66) rather the larger and brighter; D'A., '*magnifica;*' 6′ × 2′. The other resolved in centre. L.P., both spiral.

3655 (H. I 5). xi^{h} 18^{m}·7, N. 17° 2′. Pretty bright.

3817 (h. 947). xi^{h} 37^{m}·7, N. 10° 45′. First of a faint group. H. I 21, 1^{m} *p*, 70′ *n*, a large bright neb.

LEO MINOR.

This small constellation contains several pairs, and neb., but the latter too faint for general interest.

Double Stars.

Σ 3121. ix^{h} 13^{m}·1, N. 28° 55′ : 7·2, 7·5 : 20° : 0″·8 : '32. Bin., 34 yrs. Angle increases. A., '12 : 186°·1 : 0″·3.

Σ 1369. ix^{h} 30^{m}·4, N. 40° 19′ : 7, 8 : 147°·4 : 24″·7. Fr., 8 m^{g}. : 324° : 118″·2.

Σ 1374. ix^{h} 30^{m}·4, N. 39° 19′ : 7, 8·3 : 274°·7 : 3″·3 : ysh., v. bl. Do., '03 : 287°·3.

11 (Hu. 1128). ix^{h} 30^{m}·9, N. 36° 11′ : 5·5, 14 : 35°·1 : 5″·8.

Σ 1421. x^{h} 13^{m}·6, N. 27° 56′ : 7·5, 8·5 : 330°·4 : 4″·4.

31 (Hu. 879). x^{h} 23^{m}·3, N. 37° 7′ : 4, 6·5 : 231°·4 : 0″·4.

Σ 1443. x^{h} 28^{m}·7, N. 38° 6′ : 9, 9 : 156°·3 : 4″·8.

Σ 1449. x^{h} 30^{m}·6, N. 35° 33′ : 8·5, 8·7 : 289°·2 : 36″. β, '03 : 37″·8, from p.m.

Σ 1458. x^{h} 35^{m}·0, N. 32° 8′ : 8, 8·2 : 215°·4 : 17″·7.
Σ 1459. x^{h} 35^{m}·6, N. 38° 50′ : 8, 8·5 : 153°·1 : 5″·2.
40 (β 913). x^{h} 38^{m}·6, N. 26° 45′ : 6, 13 : 122°·8 : 10″·9.
A., '99 : 118°·1 : 13″·1, from p.m.

Variables.

R (var.). ix^{h} 40^{m}·8, N. 34° 53′ : 7–13 : 370^{d}·5 : Schönfeld.
16. ix^{h} 45^{m}·3, N. 40° 0′ : R. : var. Fr., and Es. III.

Nebulæ.

2683 (H. I 200). viii^{h} 47^{m}·6, N. 33° 43′. H. calls this a very beautiful object, 8′ × 3′. Sm. saw a splendid centre. Scarcely worth the search with 3$\frac{7}{10}$, but in a very fine district, a little *p* the most *n* group of Cancer.

3245 (H. I 86). x^{h} 22^{m}·8, N. 28° 55′. D'A., very bright, oblong. E. of Rosse, 6′ × 40″, with nucleus like a star 11 m^{g}.

LEPUS.

A little asterism under the legs of Orion; so near the horizon that it can only be well seen on the meridian, and opportunities must not be thrown away.

Double Stars.

β 314. iv^{h} 55^{m}·4, S. 16° 30′ : 6·5, 8·3 : 326°·9 : 1″.
Distant 8·2.
Σ 631. iv^{h} 57^{m}·0, S. 13° 37′ : 7·2, 8·7 : 104°·8 : 5″·4.
See 47. v^{h} 6^{m}·4, S. 22° 36′ : 6·5, 13·4 : 39°·3 : 3″·5.
ι (Σ 655). v^{h} 8^{m}·6, S. 11° 58′ : 4·2, 10·5 : 337°·6 : 12″·8 : grnsh., o. I found *comes* certain, '80; a glimpse star, 144, 3$\frac{7}{10}$-in. This seems to exemplify Sm.'s

remark, that among minute stars, the smallest sometimes shines with a keener light than those of larger apparent magnitude.

κ (Σ 661). v$^{\rm h}$ 9$^{\rm m}$·5, S. 13° 2′ : 5, 7·9 : 358°·7 : (2″·5) : ysh., bl. Yw., grey, '51.

h. 3750. v$^{\rm h}$ 17$^{\rm m}$·0, S. 21° 19′ : *β*, 6, 10·5 : 283°·3 : 4″·3.

h. 3752. v$^{\rm h}$ 18$^{\rm m}$·5, S. 24° 51′ : 6, 9·5 : O. Stone, 104°·7 : 3″·5, with 9 m$^{\rm g}$. near.

β (*β* 320). v$^{\rm h}$ 24$^{\rm m}$·8, S. 20° 49′ : 3·5, 10·9 : De., 292°·3 : 3″·1. 1$^{\rm m}$ 51$^{\rm s}$ *p*, 2′ *n*, is *β* 319 : 7·8, 11·5 : 226°·6 : 3″·7.

α (h. 3766). v$^{\rm h}$ 29$^{\rm m}$·2, S. 17° 53′ : Wilson, 4, 9·5 : 156°·1 : 35″·4. About 6$^{\rm m}$ *f* is h. 3780 : De., 7, 8, 9, 8·5 : 6°·2, 136°, 298°·5 : 76″·3, 89″·6, 126″·6. *β* divided 7, De., 6·8, 8·3 : 144°·5 : 0″·7 ; and 9, De., 9·3, 10 : 357°·5 : 1″·3. Gore, beautiful cl. for small telescopes.

γ (H*h*. 199). v$^{\rm h}$ 41$^{\rm m}$·1, S. 22° 28′ : Sm., 4, 6·5 : 349° : 92″·9. Light y., 6·5 pale grn., '32 ; flushed, '52. To me pale y., garnet, '51 ; so Sa., '74. c.p.m. Third star, 13 : 345° : 45″ from 6·5. Gore, easy 3-in. ; Es., 2½-in.

ζ. v$^{\rm h}$ 43$^{\rm m}$·3, S. 14° 51′. *β*, pair, 45′ *nf*: 6, 10 : De., 179°·4 : 2″·7.

Σ 875. vi$^{\rm h}$ 8$^{\rm m}$·5, S. 13° 7′ : 8·7, 9·8 : 335° : 6″. h., r., v. grn. *β*, '05 : 330°·2 : 5″.

STARS WITH REMARKABLE SPECTRA, AND VARIABLES.

R (var.). iv$^{\rm h}$ 56$^{\rm m}$·0, S. 14° 56′ : 6·1–9·7 : 436$^{\rm d}$·1 : Schmidt. Hind's 'crimson star,' '45, described by him as 'of the most intense crimson, resembling a blood-drop on the background of the sky ; as regards depth of colour, no other star visible in these latitudes could be compared with it.' Type IV.

B., curious field, three pairs. and triplet, 1° 40′ *s*, a little *p*.

T (var.). v^{h} 1^{m}·4, S. 22° 1′ : 8·2–12 : 366°·5 : Har.

Es.-Birm. 120. v^{h} 7^{m}·6, S. 11° 57′ : 6·5 : R. : Morton. Var. ? III. A little *sp ι*.

Star. v^{h} 32^{m}·5, S. 25° 17′ : 7·9 : IV : Har.

S (var.). vi^{h} 2^{m}·5, S. 24° 11′ : 6·5–7·5 : Sawyer.

Es.-Birm. 170. vi^{h} 3^{m}·6, S. 21° 48′ : 6·1 : III : Pickering.

19. vi^{h} 4^{m}·2, S. 19° 9′ : 5·8 : III : Pickering.

CLUSTER.

1904 (M. 79). v^{h} 20^{m}·9, S. 24° 36′. Tolerably bright with my 64, blazing in centre ; higher powers showed it mottled. Beautiful cl. in H.'s 20-ft. reflector, nearly 3′ in diam. 4° *s*, a little *p β*, closely *f* a 6 m^{g}. star.

LIBRA.

S. declination combines with long days and late sunsets to give trouble in looking for the objects in this constellation, which are, however, well worth the pains.

DOUBLE STARS.

Σ 1833. xiv^{h} 18^{m}·4, S. 7° 24′ : 7, 7 : 166°·7 : 4″·9.

Σ 1837. xiv^{h} 20^{m}·4, S. 11° 18′ : 7·1, 8·7 : 326°·9 : 1″·4. Hu., '02 : 303°·5.

β 117. xiv^{h} 26^{m}·9, S. 15° 15′ : 8, 9 : De., 95°·6 : 2″·4.

5 (Hn. 20). xiv^{h} 41^{m}·6, S. 15° 7′ : *β*, 6·3, 11 : 249°·8 : 2″·7.

Σ 1876. xiv^{h} 42^{m}·1, S. 7° 3′ : 8·1, 8·6 : 51°·7 : 1″·2 : ysh. Ph., '13 : 80°·8.

β 346. xiv^{h} 44^{m}·1, S. 17° 0′ : De., 7·2, 8 : 235°·7 : 1″·2. Doo., '05 : 252°·3 : 1″·6.

μ (β 106). xiv^h 44^m·9, S. 13° 49′: 5·5, 6·3: 333°·2: 1″·5. β, seen 2½-in. Three *comites:* 14·5, 13·9, 12·8: 283°·7, 185°·5, 232°·5: 18″·3, 26″, 27″·2.

α^2. xiv^h 46^m·4, S. 15° 42′: 3, 6 (α^2). Pale y., whitish. Wide.

H*h*. 457. xiv^h 52^m·7, S. 21° 2′: 6, 8: Piazzi, 251°·4: 9″·4, 1806. Fr., '14: 297°·3: 18″·4. Both have large p.m., 2″·1 in same direction, 6 moving fastest.

18 (Σ 1894). xiv^h 54^m·6, S. 10° 50′: 6, 10·2: 38°·8: 19″·5: y., o.

β 1085. xiv^h 54^m·7, S. 4° 40′: 6, 13·2: 19°·5: 9″·3.

β 119. xv^h 1^m·3, S. 6° 42′: De., 8, 8·5: 313°·1: 1″·5. Motherwell, '08: 303°·5. *nf* δ.

Σ 3090. xv^h 4^m·6, S. 0° 40′: 8·3, 8·7: 275°·5: 1″·8.

ι (H*h*. 465). xv^h 7^m·7, S. 19° 30′: 5, 9: 110°·5: 57″·5. β doubles *comes:* 10, 10: 24°·8: 1″·8. Doo., '02: 18°·6.

H*h*. 467. xv^h 10^m·0, S. 18° 8′: β, 6·9, 7·7: 140°·2: 47″·2.

β 350. xv^h 10^m·9, S. 27° 18′: 6·5, 8: 157°·7: 1″·3.

β. xv^h 12^m·7, S. 9° 5′: 2·5. Inserted for its beautiful pale grn. hue, very unusual among conspicuous stars; deep green, like deep blue, is unknown to the naked eye.

Σ 1939. xv^h 23^m·1, S. 10° 41′: 8, 9: 134°·6: 9″·3. Fr., '16: 131°·2: 8″·7.

h. 4783. xv^h 27^m·1, S. 19° 53′: 6, 10: 281°·7: 11″.

Σ 1962. xiv^h 34^m·3, S. 8° 32′: 6·3, 6·4: 187°·1: 11″·8: w. Fr., y.; m^{gs}. overrated, '76. A striking object.

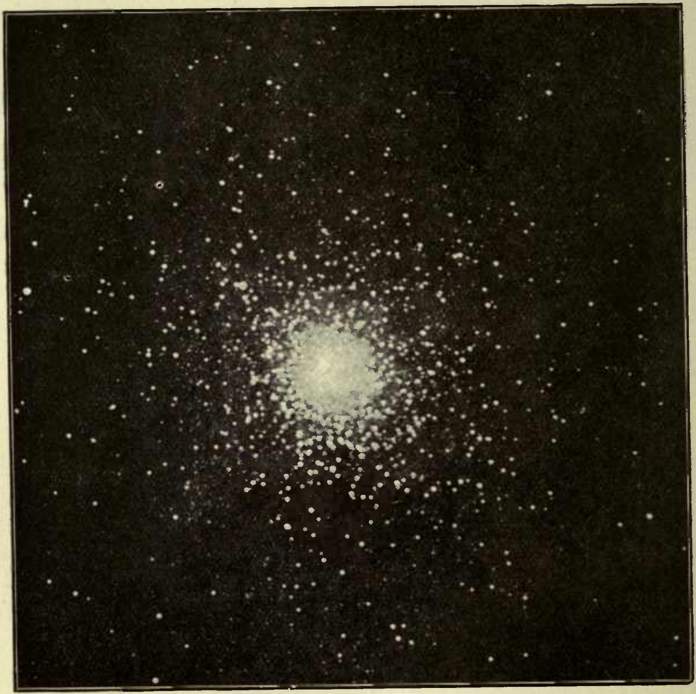
β 121. xv^h 34^m·7, S. 27° 23′: 8·2, 8·2: 277°·5: 1″·5.

42 (Innes). xv^h 35^m·5, S. 23° 34′: 5·1, 9: 44°·5: 1″·8.

β 122. xv^h 35^m·3, S. 19° 31′: De., 7, 7·4: 204°: 1″·8.

Σ 1966. xv^h 37^m·6, S. 10° 53′: 9, 9: 232°·5: 23″·2.

β 35. xv^h 38^m·3, S. 15° 46′: De., 7, 8·5: 99°·5: 2″·3.



THE STAR CLUSTER, M. 5, LIBRÆ.

Photographed at the Lick Observatory.

Σ 3096. xv^{h} 43^{m}·7, S. 5° 5′ : 9, 9 : 85°·6 : 3″·1.
Σ 3097. xv^{h} 46^{m}·6, S. 8° 47′ : 8·8, 9·2 : 181° : 4″.
47 (Hu. 1274). xv^{h} 50^{m}·4, S. 19° 9′ : 6·5, 8·5 : 153°·7 : 0″·4.

STARS WITH REMARKABLE SPECTRA, AND VARIABLES.

V (var.). xiv^{h} 35^{m}·9, S. 17° 19′ : 9·3–13·3 : 255^{d}·2 : Schönfeld.
Es.-Birm. 419. xiv^{h} 53^{m}·4, S. 12° 7′ : 7 : R. Hn. : III.
δ (var.). xiv^{h} 56^{m}·7, S. 8° 12′ : 4·8–6·2 : 2^{d}·3 : Algol type. Schmidt.
T (var.). xv^{h} 6^{m}·2, S. 19° 42′ : 9<16 : 238^{d}. Palisa.
Y (var.). xv^{h} 7^{m}·5, S. 5° 43′ : 8·2–12 : 272^{d} : Bauschinger.
ι (var.). xv^{h} 7^{m}·7, S. 19° 29′ : 4·3–5 : Har.
Es. 205. xv^{h} 10^{m}·8, S. 2° 6′ : 8 : R : III : Es.
S (var.). xv^{h} 16^{m}·8, S. 20° 6′ : 7·6<13 : 192^{d}·1 : Borrelly.
RS (var.). xv^{h} 19^{m}·6, S. 22° 38′ : 6·6–12 : 219^{d} : Fleming.
X (var.). xv^{h} 31^{m}·6, S. 20° 54′ : 9·5–14 : 163^{d}·6 : Peters.
W (var.). xv^{h} 33^{m}·3, S. 15° 55′ : 9·8–15 : 205^{d}·5 : Peters.
U (var.). xv^{h} 37^{m}·4, S. 20° 55′ : 9<14 : 226^{d}·2 : Peters.
R (var.). xv^{h} 49^{m}·1, S. 16° 0′ : 9·2<13 : 242^{d}·4 : Pogson.
Es.-Birm. 443. xv^{h} 50^{m}·1, S. 20° 35′ : 8·3 : R : Hn. IV ?
Es.-Birm. 444. xv^{h} 51^{m}·7, S. 20° 33′ : 8·2 : R : Hn. III ?

CLUSTERS.

5897 (H. VI 19). xv^{h} 12^{m}·8, S. 20° 43′. Globular cl. of small stars.

5904 (M. 5). xv^{h} 14^{m}·4, S. 2° 22′. Beautiful assemblage of minute stars (h., 11–15 m^{g}.), greatly compressed in centre. M. saw none. H. about 200 with 40-ft. reflector. E. of Rosse, curved exterior branches; seen also by Buffham, with 9-in. mirror. Packer finds two stars among the outliers var. Confirmed at Harvard. Closely *np* 5 Serp. 5 m^{g}.

LYNX.

A troublesome constellation, excepting with an equatorial mounting, as there are few conspicuous leaders among a number of tolerably considerable stars, which are puzzling in the finder. The beauty of its pairs will, however, reward a persevering observer.

Double Stars.

Σ 866. vi^{h} 10^{m}·8, N. 62° 14′ : 7·7, 8·8, 8·2 : 193°·4, 264°·7 : 17″·8, 78″·8.

4 (Σ 881). vi^{h} 15^{m}·0, N. 59° 24′ : 6·4, 7·9 : 89° : 0″·8. '30. Ph., '14 : 113°·0. Bin.

Σ 935. vi^{h} 32^{m}·2, N. 52° 22′ : 8·3, 9 : 322°·2 : 3″·4.

Σ 936. vi^{h} 32^{m}·8, N. 58° 11′ : 7, 8·7 : 254°·9 : 1″·6 : y., bl. Storey, '10 : 271°·6 : 1″·4.

Σ 946. vi^{h} 37^{m}·8, N. 59° 32′ : 7·2, 9 : 133°·5 : 4″·2 : w., bl.

12 (Σ 948). vi^{h} 39^{m}·2, N. 59° 32′ : 5·2, 6·1, 7·4 : 153°·7, 304°·2 : 1″·5, 8″·7 : two grnsh. w., blsh. Ph., '14 : 112°·2, 306°·3 : 1″·6, 8″·5. Two yw., ruddy, '54. So Hunt. Elongated, 80 : divided at times 144. Bin.

Σ 958. vi^{h} 41^{m}·5, N. 55° 48′ : 6, 6 : 256°·7 : 5″·1 : w. Y., '52, '57. c.p.m.

Σ 960. vi^{h} 43^{m}·2, N. 53° 8′ : 7·3, 9·2 : 66°·4 : 21″·9.

14 (Σ 963). vi^{h} 46^{m}·5, N. 59° 33′ : 5·9, 7·1 : 51°·5 : 0″·9 : gold, purple. Storey, '10 : 88°·5 : 0″·5. 7 grn. '69. Closing.

Σ 968. vi^{h} 46^{m}·5, N. 52° 47′ : 8, 9 : 287°·3 : 20″·6.

15 (OΣ 159). vi^{h} 50^{m}·5, N. 58° 32′ : 5·1, 6·2 : 317°·4 : 0″·6 : y., gold. Storey, '10 : 14°·8 : 0″·9. β, *comes*, 12½ : 346°·3 : 26″·2.

Σ 1001. VI^h 56^m·6, N. 54° 18′ : 7·1, 8·7 : 64° : 8″·9 : gold, o. *Comes* to 8·7, 9 : 354°·8 : 1″·7. Storey, '10 : 0°·3.

Σ 1002. VI^h 57^m·4, N. 56° 34′ : 8·5, 9 : 316°·6 : 30″·2. A. divides 8·5 : 9·3, 9·3 : 316°·4 : 0″·2.

Σ 1009. VI^h 59^m·3, N. 52° 53′ : 6·7, 6·8 : 159°·2 : 2″·9.

Σ 1025. VII^h 6^m·3, N. 55° 56′ : 7·5, 7·8 : 141°·2 : 22″·7. Miller, '04 : 133°·3 : 24″·4.

Σ 1033. VII^h 8^m·5, N. 52° 41′ : 7·4, 8 : 282° : 1″·4.

Σ 1044. VII^h 10^m·4, N. 47° 47′ : 8·5, 8·7 : 167°·2 : 12″·4.

Σ 1050. VII^h 13^m·4, N. 55° 4′ : 7·3, 8 : 19°·2 : 19″·4.

20 (*Σ* 1065). VII^h 16^m·2, N. 50° 18′ : 6·6, 6·8 : 253°·4 : 15″. c.p.m.

19 (*Σ* 1062). VII^h 16^m·4, N. 55° 25′ : 5·3, 6·6 : 312°·4 : 14″·7. Sm., distant 8. Fr., 6·6, lilac.

β 758. VII^h 22^m·9, N. 48° 21′ : 6, 11·2 : 93°·1 : 16″·6.

Σ 1086. VII^h 22^m·9, N. 42° 56′ : 7·5, 9 : 102°·3 : 12″·2 : v.y., o.

O*Σ* 174. VII^h 29^m·1, N. 43° 16′ : 6·5, 8·1 : 84°·3 : 2″. Mädler pair *p*, 9, 9 : 116°·5 : 3″·9.

Σ 1174. VII^h 59^m·0, N. 47° 32′ : 8, 8·5 : 215° : 5″·7. A. divides 8 : 8·5, 8·5 : 291°·2 : 0″·2.

27 (Espin 70). VIII^h 2^m·4, N. 51° 44′ : 4·5 : *comes* at 265°·8 : 47″·7, double : 12·5, 13 : 248°·4 : 7″·5.

Σ 1184. VIII^h 4^m·2, N. 38° 6′ : 8, 8·5 : 340°·4 : 27″·1. Es., *comes*, *β*, 13·5 : 213°·7 : 18″·9.

Σ 1187. VIII^h 4^m·4, N. 32° 28′ : 7·1, 8 : 71° : 1″·6. Bowyer, '06 : 43°·3 : 2″·2.

Σ 1200. VIII^h 10^m·1, N. 50° 1′ : 8·5, 8·5 : 0°·7 : 8″·4.

Σ 1204. VIII^h 10^m·6, N. 38° 44′ : 8, 9 : 103°·9 : 11″·8.

Σ 1211. VIII^h 13^m·1, N. 39° 15′ : 8·7, 9·2 : 132°·7 : 1″·6. Bowyer, '12 : 124°·3 : 0″·8. Doo., *comes*, 12·7 : 1° : 27″·1.

OΣΣ 93. viii^{h} 19^{m}·3, N. 42° 17′ : De., 6, 8 : 168°·3 : 76″·6 : gold, azure. Fr., or. red, fine bl. Fr. '14 : 77″·4.

Σ 1222. viii^{h} 21^{m}·1, N. 37° 48′ : 8, 9 : 46°·6 : 10″.

Σ 1225. viii^{h} 23^{m}·2, N. 51° 18′ : 8·5, 8·5 : 194°·2 : 3″·5.

Σ 1234. viii^{h} 27^{m}·0, N. 55° 38′ : 7, 8·3 : 71°·3 : 20″·8 : y., o. β., '06 : 68°·2 : 22″·4.

Σ 1242. viii^{h} 30^{m}·4, N. 47° 24′ : 8·6, 9·3 : 170°·5 : 2″·5.

Group. viii^{h} 35^{m}·5, N. 45° 11′ : five stars in line, and others smaller. Es.

Σ 1256. viii^{h} 37^{m}·4, N. 49° 36′ : 7·8, 9·3 : 212°·3 : 25″·5.

Σ 1258. viii^{h} 37^{m}·8, N. 49° 10′ : 7·1, 7·4 : 331°·4 : 9″·6.

Σ 1263. viii^{h} 40^{m}·0, N. 44° 0′ : 7·6, 8·2 : 359° : 4″·9 : '28. β, '03 : 20°·5 : 56″·8. From p.m. 0″·7.

Σ 1259. viii^{h} 41^{m}·5, N. 38° 47′ : 8·5, 9 : 340°·9 : 5″.

Σ 1274. viii^{h} 44^{m}·9, N. 38° 38′ : 7, 8·7 : 40°·8 : 8″·9 : v.w., ash.

Σ 1282. viii^{h} 45^{m}·8, N. 35° 22′ : 7, 7 : 277°·4 : 3″·4.

Σ 1289. viii^{h} 49^{m}·4, N. 43° 54′ : 7·7, 8·5 : 4°·2 : 3″·8.

Σ 3120. viii^{h} 50^{m}·8, N. 43° 58′ : 7·8, 8·8 : 348°·1 : 1″·5 : yw. Doo., *comes*, 13·5 : 116°·6 : 8″·1.

Σ 1296. viii^{h} 54^{m}·3, N. 35° 16′ : 8·5, 9 : 71°·2 : 2″·8.

Σ 1333. ix^{h} 13^{m}·5, N. 35° 42′ : 6·6, 6·9 : 39°·4 : 1″·4. Naked eye star, *np α*.

38 (Σ 1334). ix^{h} 13^{m}·9, N. 37° 10′ : 4, 6·7 : 240°·2 : 2″·7 : grnsh. w., bl. Yw., tawny, '50, '52. Fr., 6 pale y., '77.

37 (OΣ 199). ix^{h} 15^{m}·2, N. 51° 36′ : 6·1, 10·2 : 116°·8 : 5″·7.

Σ 1338. ix^{h} 16^{m}·1, N. 38° 32′ : 7, 7·2 : 121°·1 : 1″·8. Bowyer, '12 : 174°·2 : 1″·6. Bin.

α, 40. ix^{h} 16^{m}·2, N. 34° 44′ : 4 : or., has attendant violet, which is Σ 1342 : 8·6, 11 : 326°·9 : 17″·9.

39 (Σ 1340). ix^{h} 17^{m}·1, N. 49° 53′ : 6·5, 8·3 : 319°·4 : 6″·1. c.p.m.

Σ 1344. ix^h 18^m·5, N. 39° 29′ : 8·5, 9·2 : 106°·6 : 3″·6.
41 (OΣΣ 99). ix^h 23^m·5, N. 45° 58′ : De., 5·6, 7·8 : 161°·8 : 82″·5 : y., w. or azure. *β*, '03 : 79″·8. Deep y., lilac; a 10 m^g. star forms a triangle, '52.

Stars with Remarkable Spectra, and Variables.

1. vi^h 10^m·5, N. 61° 33′ : 5·5 : III : D'A.
R (var.). vi^h 54^m·7, N. 55° 27′ : 7–13·8 : 379^d·2 : Krüger.
Es.-Birm. 231. vii^h 22^m·4, N. 46° 8′ : 6·7 : R. : var. : III : Es. Var. 7·8–8·4. Har.
Es.-Birm. 247. vii^h 38^m·8, N. 39° 2′ : 7·7 : Y.R. : III : Du.

LYRA.

For its size, one of the most remarkable constellations, full of beautiful fields, and adorned by one of the great leaders of the firmament.

Double Stars.

Ho. 432. xviii^h 21^m·3, N. 38° 42′ : 6·5, 13 : 289°·4 : 17″·2.
Σ 2328. xviii^h 26^m·4, N. 29° 52′ : 8·0, 8·3 : 73° : 3″·4.
β 1253. xviii^h 28^m·8, N. 30° 30′ : 6·2, 13·5 : 156°·3 : 7″·4.
Σ 2349. xviii^h 33^m·7, N. 33° 24′ : 5·5, 10·7 : 205°·5 : 7″·3 : blsh. w., o. Wa., minute *comes*.
Σ 2351. xviii^h 33^m·6, N. 41° 13′ : 7·4, 7·4 : 339°·8 : 5″·2. Minute, but pretty.
α (Σ II 9). xviii^h 34^m·2, N. 38° 42′ : 1, 10·5 : 137°·8 : 34″ : blsh. w., o., 1836. Wega. To my sight, inferior to Sirius only. H. and h. have ranked Arcturus and Capella higher: probably differences of colour affect materially the estimates which

different eyes form of magnitude—a supposition entertained by Sm., as well as by other observers. Wollaston's experiments, from which he allowed Wega but $\frac{1}{9}$ of the light of Sirius, must surely have involved some fallacy. Humboldt thought it twinkled less than Arcturus and Procyon. Its colour to me pale sapphire—a lovely gem. Its enormous real bulk is evident from its very minute and doubtful parallax, giving perhaps 18 yrs. of light passage. Huggins thinks that it is approaching us at 44 to 54 miles per second. The optical attendant, whose distance is increasing (Fr., '14: 166°·6: 55″·0) is a well-known test: my $3\frac{7}{10}$-in. sometimes showed it in favourable weather. I have thought it easier with 80 than 144; De. thinks it brighter than formerly. His mean m$^{\mathrm{g}}$. is 8·8. It must be looked for very near the rays of *a*, as there are other very minute stars at greater distances in the field. It has been detected by Erck with $2\frac{1}{10}$-in. of a $7\frac{1}{2}$-in. achr., glimpsed by Wa. with $1\frac{6}{10}$-in. of $4\frac{3}{10}$-in. achr., and seen with $8\frac{1}{2}$-in. 'With' mirror less than 30$^{\mathrm{m}}$ after sunset. Winnecke a fainter *comes* (Greenw., '99: 285°·1: 54″·4), also increasing in dist. 6$^{\mathrm{m}}$ *p*, 5′ *s*, is *Σ* 2338: 8·5: ysh., 9·7, 8: 300°·5, 209°·1: 13″·4, 77″·1. 1° *n* of *a* is Es.-Birm. 555: 6·5: y.r.: III. Du. Irreg. Var. Es.

Σ 2356. xviii$^{\mathrm{h}}$ 35$^{\mathrm{m}}$·2, N. 28° 38′: 8, 9: (57°·1): 1″: y.

Σ 2358. xviii$^{\mathrm{h}}$ 35$^{\mathrm{m}}$·5, N. 30° 39′: 8·8, 9: 216°·5: 2″·6.

Σ 2362. xviii$^{\mathrm{h}}$ 35$^{\mathrm{m}}$·6, N. 35° 59′: 7·1, 8·4: 180°·2: 4″: y.w., blsh.

Σ 2367. xviii$^{\mathrm{h}}$ 38$^{\mathrm{m}}$·2, N. 30° 13′: 7, 7·5: 68°·3: 0″·4: y. Lewis, '06: 254°·4. Bin. with orbit in the line of sight. *Comes*, 8·4 : 193°·9 : 14″·1 : blsh. HΣ, another.

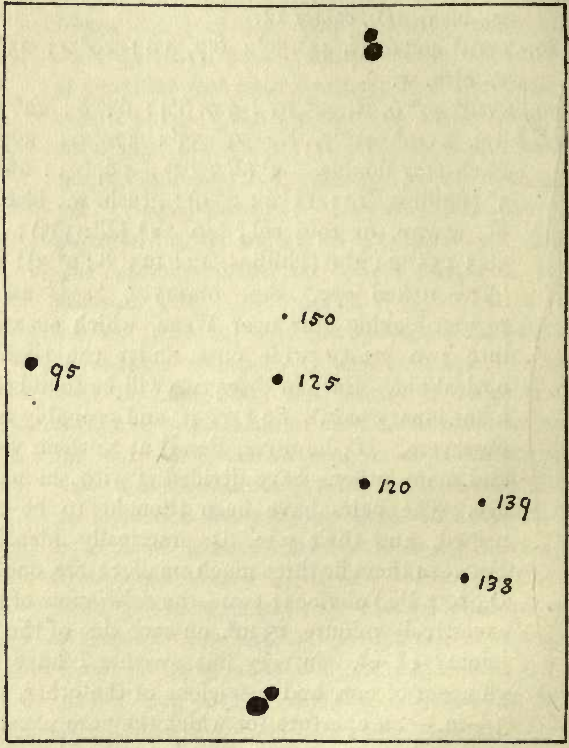
Σ 2372. XVIII^h 39^m·2, N. 34° 40′ : 6·7, 8·2 : 84°·2 : 25″·1 : w., blsh. D., *comes* 12.

Σ 2380. XVIII^h 40^m·6, N. 44° 50′ : 6·7, 8·2 : 10°·2 : 25″·8 : y., blsh. w.

Σ 2376. XVIII^h 40^m·6, N. 30° 19′ : 7·7, 8·4 : 63°·8 : 22″·3.

$\epsilon^1\epsilon^2$ (Σ I 37). XVIII^h 41^m·7, N. 39° 35′ : 172°·9 : 207″·1. Each star double. ϵ^1 (Σ 2382) : 4·6, 6·3 : 26°·1 : 3″ (Phillips, '12 : 11°·2 : 2″·9) : grnsh. w., blsh. w. Y., tawny, or rose col., '49. ϵ^2 (Σ 2383) : 4·9, 5·2 : 155°·2 : 2″·6 (Phillips, '12 : 123°·8 : 2″·3) : v.w. 'The naked eye,' Sm. observes, 'sees an irregular-looking star near Wega, which separates into two pretty wide ones under the slightest optical aid. Each of these two will be found to be a fine binary pair.' So I see it, and probably most observers. H., however, Bessel at thirteen years, and many others, have divided it with the naked eye. The pairs have been thought to be connected, and their p.m. is practically identical. Between them lie three much smaller stars, one (9·5 D., 10·1 De.) obvious; two—the *debilissima* of h.—excessively minute, 13 m^g. on each side of the line joining ϵ^1, ϵ^2. In very fine weather I have had glimpses of one, and suspicions of the other, with $3\frac{7}{10}$-in. —an aperture for which they are excellent tests. In very fine air Wa. has seen them with $2\frac{1}{8}$-in. achr. Grover, Squire, alternately var., and Fr., who has seen a little star *p* brighter than either. They form Sh. 277, h. 31° in '31. β, '78 : 38°·4 : 46″·7. Es., '14 : 37°·5 : 45″·8 from p.m. of A towards 67°. Lassell added *comes* to B, Es., '14 :

352°·5 : 25″·9. M^g. 15·0 There are two *comites* to A : 13·9, 13·8 : 280°, 245° : 43″·2, 43″·6, and



ε Lyræ from Measures made with a 24-in. Calver Reflector.

two others some twice the distance, at nearly the same angles. 27′ *s* is Σ 2392 : 8·2, 10·2, 9·3 : 317°·2, 178°·5 : 2″·7, 23″·3 ; 54′ *s* of this is Σ 2393 : 22°·5 : 10″·4 : red. 0. Es., *comes*, bl.

β, ·05 : 13″·3. 1^m 22^s *f* ε is β 51 : 9, with double *comes* (10·2, 11·2 : 297°·5 : 6″·1), at 185°·2 : 74″·9.

ζ (Σ I 38). XVIII^h 42^m·0, N. 37° 31′ : 4·2, 5·5 : 149°·7 : 43″·7 : grnsh. w. Y., grnsh., '49 ; pale y., pale lilac, '50. β, two *comites*, 15·7, 13·2 : 48°·7, 274°·4 : 26″·9, 43″·4. Third, 11·8, more distant. Spect. Bin.

Σ 2394. XVIII^h 42^m·9, N. 41° 57′ : 8·7, 9·2 : 201°·5 : 6″·6.

Σ 2390. XVIII^h 42^m·9, N. 34° 25′ : 7·3, 8·7 : 157°·9 : 4″·2.

Σ 2397. XVIII^h 44^m·2, N. 31° 18′ : 7·2, 9·7 : 267°·4 : 3″·7 : y., bl.

h. 1347. XVIII^h 44^m·7, N. 28° 20′ : De., 8, 8·5, 8·2 : 275°·0, 164°·1 : 18″·4, 75″·3. Pretty object.

β (Σ I 39). XVIII^h 47^m·1, N. 33° 16′ : 3, 6·7 : 149°·8 : 45″·8 : y., w. Goodricke found large star, var., 1784. 3·4–4·1 : 12^d·9. Secondary *min.* midway between primary *minima.* Se. found bright lines. They change their relative positions according to the phase, and accompany dark hyd. and helium lines. Doubling of dark lines also occurs, and probably there are at least three bodies here (Har.). Probably col. is var. h. and South, '24, Sm., '34, w. I found it '49, '50, '55, decidedly yellower than γ, which I saw w., or very pale y., '50, '55. 5½-in. both very pale, but β the yellower, '62. γ is suspected var., and has 4 faint attendants. The closest (OΣ 544), 12 m^g. : 296°·4 : 13″·9. 48′ *s* β, is ν^1 (Ho. 440), 5·5, 13 : 176°·9 : 19″.

δ (H*h*. 586). XVIII^h 50^m·9, N. 36° 52′ : 4, 5 : Fr., 5, 6, '77 : fine or., w. Fine III type. Glorious field. 3^m *p*, 11′ *s*, is Es. 241 : 9·1, 10·7 : 69°·8 : 2″. 17^s *p*, 24′ *n* δ^1, is β 137 : De. 8·2, 8·7 : 123°·8 : 1″·2.

OΣ 525. XVIII^h 51^m·9, N. 33° 52′ : 5·1, 10·3, 7·1 : 131°·3, 350°·5 : 1″·2 : 45″·5 : y., o., bl. Beautiful miniature of β Cygni with two minute companions. D. calls 10·3 most difficult to measure, and nearly *min. vis.* of his 6⅓-in. achr. OΣ thinks it var. as De. makes it 8 and 9. I held it pretty steadily with 9⅓-in. spec. A little *sf* is Σ 2421 : 8, 8·7 : 68°·8 : 21″·1. β, '03 : 64° : 22″·6.

Ho. 270. xviii^{h} 52^{m}·3, N. 41° 30′ : 6, 13 : 307°·2 : 8″·2, with 12 : 38°·7 : 23″·2.

Σ 2419. xviii^{h} 52^{m}·3, N. 29° 7′ : 8·7, 8·8 : 179°·5 : 3″·2.

β 648. xviii^{h} 54^{m}·0, N. 32° 48′ : 6, 9·5 : 312°·5 : 0″·6 : '78. Bowyer, '12 : 183°·8 : 0″·4. Bin.

Σ 2427. xviii^{h} 55^{m}·3, N. 38° 7′ : 8·5, 9 : 63°·6 : 44″·2 (β, '05 : 61°·4 : 48″·6). 9 *comes*, 9·2 : 80°·1 : 6″·9. An interesting group.

Σ 2430. xviii^{h} 56^{m}·2, N. 29° 29′ : 8·5, 8·5 : 359°·3 : 1″·9.

Σ 2441. xviii^{h} 59^{m}·6, N. 31° 16′ : 7·7, 9·3 : 291°·9 : 5″·2 : ysh., o. β, '05 : 279°·3.

Σ 2448. xix^{h} 0^{m}·8, N. 35° 37′ : 8·2, 8·2 : 193°·2 : 2″·4.

Σ 2456. xix^{h} 3^{m}·0, N. 38° 24′ : 8·2, 8·2 : 13°·6 : 29″·1. Ph. '13 : 183°·1 : 23″·2. HΣ, *comes*, 13·5 : 96°·6 : 21″·3.

Σ 2458. xix^{h} 3^{m}·7, N. 27° 38′ : 8·5, 9, 7·5 : 227°·7, 244°·3 : 10″·9, 70″·4. Fr., '14, AB, 11″·9.

Σ 2459. xix^{h} 4^{m}·1, N. 25° 51′ : 8·4, 9·1 : 233° : 13″·7.

17 (Σ 2461). xix^{h} 4^{m}·4, N. 32° 23′ : 5·7, 9·8 : 330°·6 : 3″·7 : ysh., blsh. β, '05 : 315° : c.p.m. β finds that an 11 m^{g}. star ('10 : 65°·1 : 134″·5) has the large p.m. of 1″·75 towards 49°·5.

Σ 2466. xix^{h} 4^{m}·8, N. 29° 41′ : 8, 8·5 : 109°·3 : 2″·3.

Σ 2469. xix^{h} 5^{m}·1, N. 38° 48′ : 7·6, 8·7 : 120°·9 : 1″·3.

Σ 2467. xix^{h} 5^{m}·6, N. 30° 42′ : 8·6, 9 : 263° : 10″·1.

Σ 2470. xix^{h} 5^{m}·8, N. 34° 38′ : 6·7, 8·2 : 271°·6 : 12″·9 : w., 8·2 pale bl. '82. Fr., '14 : 269°·4 : 13″·4.

Σ 2472, *Σ* 2473. xix^{h} 5^{m}·8, N. 37° 47′ : *Σ* 2472 : 7·5, 9·2 : 336°·5 : 17″·1. *β*, ’05 : 19″·3. *Σ* 2473 : 9, 9·2 : 293°·2 : 6″·2. Pairs 75″ apart ; minute star, 12 m^{g}., between. Sa., several other minute *comites.*

Σ 2474. xix^{h} 6^{m}·1, N. 34° 28′ : 6·7, 8 : 258°·7 : 17″·3 : ysh., ashy. 8 ruddy, ’82. Fr., bl. ’15.

Ho. 572. xix^{h} 6^{m}·3, N. 30° 26′ : 6·5, 12·2 : 315°·7 : 18″·4.

Σ 2481. xix^{h} 8^{m}·4, N. 38° 39′ : 8, 8 : 234°·3 : 3″·8. Bowyer, ’12 : 218°·4 : 4″·3. Se., split *comes* : 9 : De., 69°·8 : 0″·4 : ’77. A., ’12 : 102°·2 : 0″·5. Bin. 58 years. Pair 3′ *s*, 10·5, 10·7.

Σ 2483. xix^{h} 9^{m}·3, N. 30° 13′ : 7·2, 8·3, 8·5 : 319°, 237° : 9″·7, 71″·1. Fr., ’15 : AB 315°·8 : 10″·2.

η (*Σ* 2487). xix^{h} 11^{m}·0, N. 39° 0′ : 4, 8·1 : 85° : 27″·9 : bl., ash. Fr., ’14 : 81°·9 : 28″·2 : w., bl. Y., grnsh., or blsh. ; 3$\frac{7}{10}$-in., and Bishop’s 7-in. ’49, ’50. 4, pale y., 5$\frac{1}{2}$-in., ’62. Fr., yw., indigo, ’79 ; De., w., azure. A low-powered field includes two other small pairs, *sp* and *f* ; B. adds a third.

O*Σ* 371. xix^{h} 12^{m}·7, N. 27° 19′ : 6·8, 6·9 : 154°·1 : 0″·8. Triple, 9 : 267°·8 : 47″·8.

Σ 2491. xix^{h} 13^{m}·0, N. 28° 8′ : 7·9, 9·2 : 206°·7 : 1″·1. Bowyer, ’11 : 218°·5.

θ (H*h*. 608). xix^{h} 12^{m}·9, N. 37° 57′ : 5, 8 : (Es. : 71° : 100″·1) : y., bl. ; is in a fine field.

Σ 2505. xix^{h} 16^{m}·2, N. 35° 21′ : 8, 8·7 : 314°·9 : 9″·9 : y., bl. *β*, *comes* 13 : 224° : 19″·3.

STARS WITH REMARKABLE SPECTRA, AND VARIABLES.

β (var.). See under Double Stars.

W (var.). xviii^{h} 12^{m}·2, N. 36° 38′ : 7·6–12·5 : 196^{d}·6. Anderson.

T (var.). xviii^{h} 29^{m}·6, N. 36° 56′ : 7·2–7·8 : B. : IV.

Es.-Birm. 550. xviii^h 32^m·9, N. 37° 36′ : 8 : pale R. : W.

Es.-Birm. 559. xviii^h 39^m·5, N. 36° 28′ : 7 : R. : Gage. Krueger, '91 : 5·8 : III : Var. ?

Es.-Birm. 561. xviii^h 40^m·1, N. 36° 53′ : R. : W. Var. 7–9. Safarik, and Es. IV. Se.

Es.-Birm. 564. xviii^h 40^m·6, N. 39° 13′ : 6·5 : R. : W. D., two *comites*. Var. : III.

Es.-Birm. 566. xviii^h 42^m·0, N. 33° 6′ : 7·7 : R. : B. III.

R (var.). xviii^h 52^m·9, N. 43° 50′ : 4–4·7 : 46^d : Baxendell.

Es.-Birm. 579. xviii^h 56^m·2, N. 40° 34′ : 6·5 : III : Du.

Es.-Birm. 596. xix^h 16^m·0, N. 27° 6′ : 6·7 : R. : Buckingham. III.

U (var.). xix^h 17^m·3, N. 37° 44′ : 8·3<12 : 457^d. Es. IV.

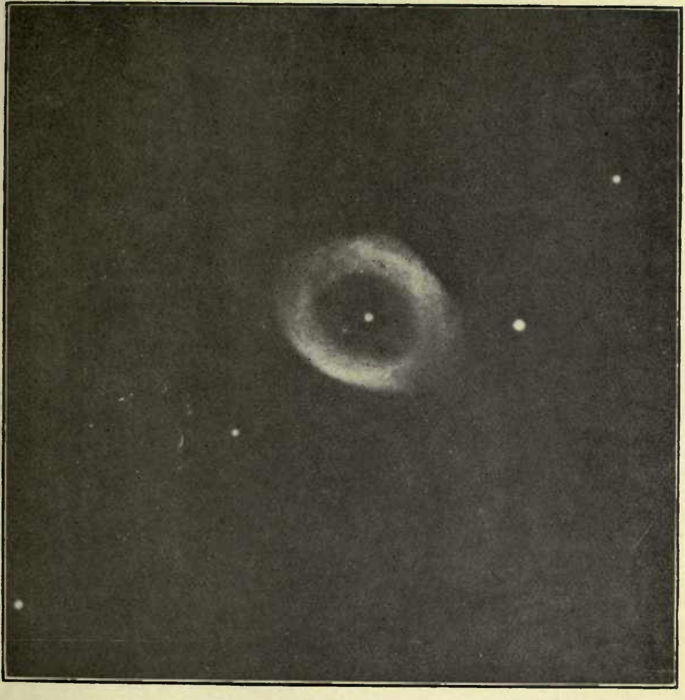
Es.-Birm. 599. xix^h 21^m·0, N. 36° 2′ : 7·9 : III : Du.

RR (var.). xix^h 22^m·9, N. 42° 38′ : 7·2–8·1 : 0^d·6 : Har.

Nebula, and Cluster.

Sweeping between Lyra and Cygnus exceedingly fine.

6720 (M. 57). xviii^h 51^m·1, N. 32° 56′. The only annular neb. accessible by common telescopes, fortunately easily found, $\frac{1}{3}$ of the distance from β towards γ. It is somewhat oval, and bears magnifying well. Its light I have often imagined fluctuating and unsteady, like that of some other plan. neb.; an illusion arising probably from an aperture too small for the object. Lick photo. gives the impression of several rings intertwined, and Wolf finds rings of different diameters and shapes for the different monochromatic radiations. There is a small star in the centre which is very conspicuous as about 12·5 on all photographs but visually very faint (Barnard, 15·5 m^g.). and a still fainter one at P. 301° about 6″ from nucleus. Huggins first found the spectrum gaseous. A minute star *f*; h., 11 m^g.; Barnard, m^g. 12·4 : P. 87°·8, D.



RING NEBULA, M. 57, LYRÆ.

Photographed at the Lick Observatory.

61″·7; D'A., certainly only 14, 1861. Yet Sa. caught it with 3-in. achr. '74. 34 sec. *p*, 12′ *n*, is the var. RX.: 12–17: 247^{d}. Dis. by Silbernagel.

Bright broad group. XVIII^{h} 53^{m}·0, N. 41° 57′.

6779 (M. 56). XIX^{h} 13^{m}·5, N. 30° 2′: faintish, perhaps resolvable with $3\frac{7}{10}$-in.; in fine field and rich region, between 3° and 4° *np* β Cygni. Sm., 'a globular cl. in a splendid field.' H., 11–14 m^{g}.

MONOCEROS.

Inconspicuous to the naked eye, but rich in groups and clusters, through including a brilliant part of the Galaxy.

Double Stars.

3 (β 16). v^{h} 58^{m}·1, S. 10° 36′: 5·5, 10: K., 356°·1: 1″·8. In a large faint neb.

4 (β 17). VI^{h} 4^{m}·7, S. 11° 8′: 6, 10·4, 10·8: 180°·4, 246°·8: 3″·2, 8″·9.

Σ 869. VI^{h} 6^{m}·9, S. 9° 50′: 7·5, 8·5: 279°: 24″·3.

β 566. VI^{h} 10^{m}·7, S. 4° 33′: 6·5, 12·5: 209°·9: 1″·9.

β 323. VI^{h} 10^{m}·8, S. 1° 42′: De., 8·5, 10·2: 96°·2: 2″·4.

5 (h. 384). VI^{h} 11^{m}·0, S. 6° 15′: 4·5, 13: 27°·2: 51″·4. h., 18 m^{g}. Sa., easy $6\frac{1}{2}$-in. spec.

Σ 898. VI^{h} 17^{m}·5, N. 11° 1′: 8·3, 8·8: 121°: 6″·1.

Σ 3116. VI^{h} 17^{m}·7, S. 11° 44′: 6·2, 10·4: 19°·2: 4″·5. β, '05: 27°·1: 3″·7.

8 (Σ 900). VI^{h} 19^{m}·5, N. 4° 38′: 4, 6·7: 25°·9: 13″·9: ysh., blsh. Golden y., lilac, '50. B., *comes* 12, Sa., est. 35°: 90″; between 2 minuter. Glorious low-power field.

Σ 901. vi^{h} 20^{m}·6, N. 10° 34′ : 7·7, 9·5 : 247°·5 : 20″. h., *comes s*.

Σ 910. vi^{h} 22^{m}·7, N. 0° 30′ : 8·3, 8·8 : 170°·9 : 0″·7 : ysh. Hu., ’02 : 158°·6. A 6·5, y. : 150°·6 : 66″·1. Near 77 Orionis, a fine 6 m^{g}. y. ; this pair *np*, another *sp* : a noble spectacle.

Σ 914. vi^{h} 22^{m}·9, S. 7° 27′ : 6·7, 9 : 297°·6 : 21″.

Σ 915. vi^{h} 24^{m}·0, N. 5° 20′ : 8, 9 : 39°·1 : 5″·9.

11 (Σ 919). vi^{h} 24^{m}·9, S. 6° 58′ : 5 has at 130° : 7″·2, 5·5, 6 : 101°·7 : 2″·5. W., ysh. w., grey or blsh. ’51. Hunt, ’62, Sa., ’75 : 5 or. H., the discoverer 1781, calls this ‘one of the most beautiful sights in the heavens.’ Packer, var. The outside stars, 5 and 6, have hydrogen lines bright. Har., double spectrum, F changing its place, like the lines in β Lyræ.

Σ 921. vi^{h} 26^{m}·7, N. 11° 19′ : 6, 8·2 : 3°·8 : 16″·3. y.w., blsh. w. Fr., ’15 : pale y., bl.

Σ 926. vi^{h} 27^{m}·4, N. 5° 50′ : 7·3, 8·7 : 287°·1 : 10″·7. yw., ash.

14 (Σ 938). vi^{h} 30^{m}·4, N. 7° 39′ : 7, 11·2 : 206°·7 : 10″·3.

Σ 939. vi^{h} 31^{m}·7, N. 5° 23′ : 8·1, 8·7, 9 : 106°·2, 49°·3 : 29″·8, 39″·8. Beautiful.

15 S (Σ 950). vi^{h} 36^{m}·6, N. 9° 58′ : 6, 8·8, 11·2 : 208°·7, 12°·9 : 2″·8, 16″·6 : grn., bl., o. Bowyer, ’12 : 127°·5 : 3″·5. *Comes* well seen ; another smaller, and more remote *np*, 5¼-in. ’64. Large star var. ? 4·9–5·4, Winnecke. Spect. Bin. Photos show large neb. near, probably connected with S. Above, 3 pairs in irreg. transverse line One, Σ 952 : 9, 9 : 295°·2 : 13″·6, another De., 9·1, 10·2 : 45°·9 : 3″·6. Fine group *s*, containing Σ 951 : 8·5, 10·7 : 45°·9 : 3″·6. Wa., *comes* to 10·7, β 209°·9 : 11″·4.

Σ 3117 : 8·9, 9·4 : 93°·2 : 0″·6. Σ 953 : 7·5, 8 330°·9 : 7″·1 : ysh., blsh. Σ 954 : 7·7, 10·2 : 153°·5 : 12″·7. Σ 3118, 30^s *f*, 6′ *s* : 9, 9·5 : 174°·8 : 2″·4.

Σ 949. vi^h 36^m·6, N. 5° 47′ : 8·5, 9 : 287°·7 : 3″·4.

β 897. vi^h 46^m·7, S. 0° 26′ : 6·6, 12 : 30°·9 : 5″·6.

Σ 987. vi^h 50^m·2, S. 5° 45′ : 7·7, 7·8 : 163°·5 : 1″·1.

Σ 986. vi^h 50^m·5, N. 9° 36′ : 8·3, 8·8 : 167°·2 : 5″·2.

β 326. vi^h 52^m·0, N. 2° 25′ : De., 8, 9·5 : 62°·8 : 1″·2.

Σ 998. vi^h 53^m·0, S. 5° 22′ : 8·2, 8·5 : 205°·5 : 3″·1.

β 327. vi^h 54^m·5, S. 2° 55′ : De., 7·5, 8 : 100°·1 : 1″, with 11·5 : 102°·6 : 13″·2.

Σ 1003. vi^h 54^m·7, S. 9° 3′ : 9, 9·2 : 320°·3 : 3″·9.

Σ 1010. vi^h 57^m·4, S. 3° 0′ : 7·8, 8·8 : 4°·5 : 23″·7. A., *comes*, 15·5 : 187°·6 : 2″·7.

Σ 1015. vii^h 1^m·0, S. 5° 39′ : 8·7, 8·7 : 195°·6 : 4″·9.

Σ 1029. vii^h 4^m·0, S. 4° 33′ : 7·4, 8·1 : 23°·4 : 2″·1.

Σ 1030. vii^h 5^m·0, S. 8° 33′ : 8, 9·2 : 42° : 15″·7.

Σ 1034. vii^h 5^m·5, S. 8° 11′ : 8·7, 9·2 : 17°·6 : 2″·5.

Σ 1043. vii^h 8^m·5, S. 0° 33′ : 8·8, 8·8 : 248°·3 : 2″·4.

Σ 1045. vii^h 8^m·7, S. 3° 1′ : 7·8, 9 : 226°·9 : 5″·9. w., ash.

24 (β 1268). vii^h 10^m·5, S. 0° 1′ : 6, 11·8 : 313°·2 : 3″·8.

Σ 1052. vii^h 10^m·8, S. 10° 8′ : 8·5, 8·7 : 20°·3 : 20″.

Σ 1056. vii^h 11^m·5, S. 1° 43′ : 7·8, 8·8 : 297°·9 : 4″ : ysh., blsh.

Σ 1077. vii^h 16^m·9, S. 0° 31′ : 9·3, 9·3 : 322°·2 : 5″·4. β, *comes*, 12·2 : 240°·5 : 21″·2.

Σ 1097. vii^h 24^m·1, S. 11° 24′ : 6·5, 8·7 : 312°·1 : 20″·2 : y., blsh. Pale r., deep bl., '51 ; h., *comes* ; β, 9·8 : 157°·2 : 23″·4. β doubles 6·5 : De., 6·3, 8·2 : 166°·5 : 0″·8, and sees another *comes* 12½ : 41°·4 : 31″·1.

Σ 1109. vii^h 27^m·8, S. 0° 21′ : 8·8, 8·8, 11 : 15°·1, 303°·6 : 3″·4, 27″·1.

Σ 1111. vii^{h} 27^{m}·9, S. 8° 32′ : 8·2, 8·7 : 219°·6 : 19″·8.

Σ 1132. vii^{h} 38^{m}·2, S. 3° 19′ : 8·1, 8·7 : 237°·9 : 19″·3. Fr., '15 : 8, 8·4 : 234°·8 : 19″·9.

Σ 1141. vii^{h} 42^{m}·9, N. 0° 13′ : 8, 8·7 : 8°·9 : 17″·7. In pretty group.

Σ 1157. vii^{h} 50^{m}·5, S. 2° 35′ : 8, 8 : 267°·3 : 1″·6. Scott, '03 : 245°·2 : 1″·2. A little *sp* is Σ 1154 : 7·7, 9·9 : 358° : 2″·3 : w., purpsh.; and further on, Σ 1152 : 8·2, 9·9 : 312°·9 : 5″·8 : y.

Σ 1183. viii^{h} 2^{m}·6, S. 9° 1′ : 5·5, 7·8 : 326°·3 : 31″ : yw., w. Fr., w., bl. A. doubles *comes:* 8·5, 12·2 : 325°·6 : 1″·2, and sees 14 m^{g}.: 20°·1 : 14″·3 from 8·5.

29 (Σ 1190). viii^{h} 4^{m}·6, S. 2° 45′ : 6, 11·7 : 104°·2 : 31″·6 : y., o. 11·7 more like 10 or 11 to me, '51, '55, '56, '72 (9-in. spec.); De., 10. So Sa., '75. Gore, 3-in. achr., '74; Fr., 11, '77. Yet h. and South missed it. Σ saw it in a 5-ft. instrument. Var.? An 8·5 : 244°·4 : 67″·1.

Σ 1233. viii^{h} 24^{m}·5, S. 2° 15′ : 7·2, 11·5 : 331°·5 : 18″·2 : ysh., o. Es., 11, var.? De., 10·4. A. divides 7·2 : 7·4, 7·5 : 59°·7 : 0″·2.

Σ 1264. viii^{h} 38^{m}·4, S. 8° 6′ : 9, 9 : 269°·7 : 5″·8.

31 (H*h*. 303). viii^{h} 39^{m}·7, S. 6° 57′ : β, 5·5, 8·1 : 308°·8 : 78″·3. Webb., fine y., beautiful bl. β, faint star: 339°·6 : 57″·1.

Stars with Remarkable Spectra, and Variables.

11 and 15 (S.). See under Double Stars.

Es.-Birm. 182. vi^{h} 17^{m}·4, S. 11° 47′ : 6·8 : R. : III? Pickering. Light bl. star near.

V (var.). vi^{h} 18^{m}·7, S. 2° 9′ : 7·2 $<$ 12·9 : 332^{d} : Schönfeld.

T (var.). vi^{h} 20^{m}·9, N. 7° 8′ : 5·7–6·8 : 27^{d} : Gould.

Es.-Birm. 194. vi^h 31^m·3, S. 1° 26′ : 8·3 : R. : III : Es.
Es.-Birm. 195. vi^h 31^m·8, S. 5° 19′ : 9·2 : R. : III : Es.
R (var.). vi^h 34^m·8, N. 8° 48′ : 9·5–13 : Irreg. : Schm.
Es.-Birm. 200. vi^h 40^m·5, N. 3° 24′ : 9·3 : IV : Pickering.
Es.-Birm. 201. vi^h 43^m·4, N. 0° 47′ : 9·6 : remarkable R. : IV ? Es.
W (var.). vi^h 48^m·2, S. 7° 2′ : 8·8–13 : 262^d·5 : IV : Es. Splendid field.
Es.-Birm. 206. vi^h 49^m·2, S. 4° 28′ : R. : Hn. IV.
Y (var.). vi^h 52^m·4, N. 11° 21′ : 8–13·5 : 225^d : Ceraski.
Es.-Birm. 208. vi^h 54^m·1, N. 6° 16′ : 8 : R. : IV : Es.
Es.-Birm. 211. vi^h 57^m·0, S. 3° 8′ : 7·7 : R. : IV : Es.
Es.-Birm. 216. vii^h 3^m·1, S. 7° 26′ : 8·3 : R. : Bessel. IV.
Es.-Birm. 219. vii^h 10^m·3, S. 9° 7′ : 8·5 : R. : Hn. III.
Es.-Birm. 230. vii^h 21^m·2, S. 2° 59′ : 9 : R. : IV : Es.
U (var.). vii^h 27^m·0, S. 9° 36′ : 5·9–8 : 45^d·2. Gould. Type of R Scuti. Es., spectrum var. ?
Es.-Birm. 236. vii^h 27^m·8, N. 0° 38′ : 8·2 : R. : Bond. III.

CLUSTERS.

2232 (10). vi^h 24^m·0, S. 4° 43′ : 6 pale y., the *lucida* of an elegant group, visible with naked eye. The Galaxy throughout this region well repays the trouble of sweeping.

2244 (H. VII 2). vi^h 28^m·4, N. 4° 55′. Beautiful; visible to the naked eye ; including 12, 6 m^g. y. ; and many 7 and 9 m^g. stars. The smallest, 14 m^g., run in rays. Small pair near centre.

2301 (H. VI 27). vi^h 47^m·7, N. 0° 33′. Bright Galaxy cl., resembling three arms of a cross.

2323 (M. 50). vi^h 59^m·1, S. 8° 14′. Brilliant cl., straggling, h. says, to 30′ ; containing a red star ; between Sirius and Procyon, $\frac{1}{3}$ nearer the former, in a superb neighbourhood, where the Creator has—

> 'Sowed with stars the heaven thick as a field.'

2548 (H. VI 22). viii^{h} 9^{m}·8, S. 5° 33′. Group of pretty uniform 9 m^{g}. stars, with a profusion of lesser ones.

OPHIUCHUS.

An extensive region, somewhat barren to the eye, but attractive to the telescope.

Double Stars.

Σ 2033. xvi^{h} 14^{m}·0, S. 2° 5′ : 8·5, 8·7 : 175°·6 : 10″·7.

ρ (H*h*. 512). xvi^{h} 21^{m}·5, S. 23° 19′ : 6, 6 : 1°·9 : 4″·1, '34. Jouffray, '05 : 353°·2 : 3″·4. Bin. Pale y., tawny, '54. Finely grouped with two 8 m^{g}. stars, the most distant of which is *β* 1115 : 8·1, 9·2 : 26°·3 : 0″·9. h., on intensely black ground, in a great blank space, existing in a vast nebula on Barnard's photo.

Σ 2048. xvi^{h} 24^{m}·5, S. 7° 58′ : 6·3, 9 : 302°·7 : 4″·7 : ysh., o. Sm. notes deep or. star in field.

λ (*Σ* 2055). xvi^{h} 26^{m}·9, N. 2° 10′ : 4, 6·1 : 331°·8 : 0″·8 : y., blsh. Ph., '14 : 70°·5 : 1″·1. Bin. Es., Fr., cols. var. ? Sa., 2 faint *comites*.

19 (*Σ* 2096). xvi^{h} 43^{m}·1, N. 2° 12′ : 6, 9·3 : 92°·6 : 22″·2 : w., ash. Fr., '15 : 90°·7 : 23″·2. Fine low-powered field.

Σ 2106. xvi^{h} 47^{m}·3, N. 9° 33′ : 6·7, 8·4 : 337°·5 : 1″. Bryant, '12 : 278°·1 : 0″·2.

21 (OΣ 315). xvi^h 47^m·4, N. 1° 22′ : 6·2, 8·1 : 167°·4 : 0″·8, '42. Furner, '08 : 157°·7. In field with Σ 2105 : 130°·4 : 29″·1 : 8, 9·5. To me, 8, 9 (Sm.'s scale), Sept. 11, '55. Σ.'s 9·5 would have been extremely minute (3$\frac{7}{10}$-in.) and certainly not rated 9 by me. De., 8·5, 9·7.

β 241. xvi^h 50^m·8, S. 21° 26′ : 6·7, 6·8 : 343° : 0″·6.

Σ 3106. xvi^h 51^m·4, S. 5° 3′ : 8·6, 8·6 : 246°·6 : 2″·4.

24 (β 1117). xvi^h 52^m·0, S. 23° 1′ : 6·4, 6·5 : 264°·2 : 0″·7. A., '12 : 281°·6.

S*h*. 240. xvi^h 52^m·4, S. 19° 25′ : 6·3, 8 : Doo., 230°·2 : 4″·9.

Σ 3107. xvi^h 54^m·2, N. 4° 4′ : 8·5, 8·5 : 112°·3 : 1″·6. A., '03 : 95°·6 : 1″·3.

Σ 2114. xvi^h 58^m·1, N. 8° 34′ : 6·2, 7·4 : 135°·7 : 1″·3. Bowyer, '12 : 165°·3.

Hu. 164. xvii^h 0^m·0, S. 12° 32′ : 6·5, 12·2 : 341°·4 : 1″·8.

Σ 2122. xvii^h 2^m·7, S. 1° 33′ : 6·5, 8·7 : 280°·5 : 20″·1.

Σ 2123. xvii^h 3^m·1, N. 6° 55′ : 8·5, 8·5 : 218°·4 : 19″·3.

A. 1145. xvii^h 4^m·1, S. 0° 59′ : 6, 8 : 240°·8 : 0″·4.

η (β 1118). xvii^h 5^m·8, S. 15° 37′ : 3·4, 3·9 : 274°·7 : 0″·3. A., '11 : 247°·5 : 0″·5.

h. 589. xvii^h 5^m·9, S. 24° 50′ : β, 7·5, 7·8 : 302° : 9″·9.

β 125. xvii^h 7^m·2, S. 26° 56′ : 7·9, 10 : 61°·3 : 1″·5. 33^s *p*, 20′ *n*, is β 956 : 8, 9·7 : 163°·1 : 0″·6.

Σ 2132. xvii^h 8^m·5, S. 3° 57′ : 8·3, 9 : 108° : 1″·5.

36 (S*h*. 243). xvii^h 10^m·5, S. 26° 28′ : 6, 6 : 43°·5 : 5″ : '35. Doo., '05 : 190° : 4″·2. Golden y., '54. Strange to say, its rapid p.m., 1″·27 annually, is identical with that of 30 Scorpii, more than 12′ dist. Fl. has found a corresponding movement in an intermediate star, 12 m^g. A dist. 7·5 with minute *comes* (h.) forms no part of the system. 2^m *f* is 38 (S 385) : 6·5, 11. Scott, 337°·1 : 6″.

39 (H*h*. 534). xvii^{h} 13^{m}·1, S. 24° 12′ : 5½, 6 : β, 356°·2 : 10″·6. Pale or., clear bl., beautiful, '54.

β 126. xvii^{h} 15^{m}·2, S. 17° 41′ : De., 6·2, 7·5 : 261°·3 : 1″·7 : w., azure. *Comes*, 11·6 : 139°·7 : 11″·5.

Σ 2149. xvii^{h} 15^{m}·7, S. 6° 21′ : 8·8, 8·8 : 23°·2 : 7″·5.

A 2241. xvii^{h} 15^{m}·7, S. 19° 15′ : 6·5, 14 : 75°·3 : 5″.

Hn. 134. xvii^{h} 19^{m}·9, S. 21° 22′ : 6·2, 12 : 149°·4 : 4″.

Σ 2156. xvii^{h} 19^{m}·8, S. 0° 45′ : 8·3, 9 : (36°·1) : 3″·3.

Σ 2160. xvii^{h} 20^{m}·9, N. 15° 41′ : 5·5, 10 : 61°·9 : 4″·1 : v.w., ash.

Σ 2159. xvii^{h} 21^{m}·2, N. 13° 24′ : 7·4, 8·1 : 326°·4 : 26″·3.

β 129. xvii^{h} 23^{m}·7, S. 25° 26′ : 7·5, 8 : Cin. 100°·3 : 0″·9.

Σ 2166. xvii^{h} 24^{m}·8, N. 11° 27′ : 5·6, 7·4 : 283°·2 : 27″·5 : w., blsh.

Σ 2171. xvii^{h} 24^{m}·9, S. 9° 56′ : 7·5, 7·6 : 75°·7 : 1″·6. Maw, '98 : 67°·6.

Σ 2170. xvii^{h} 24^{m}·9, N. 10° 33′ : 8·5, 9 : 76°·3 : 3″·8.

Σ 2173. xvii^{h} 26^{m}·3, S. 1° 0′ : 5·8, 6·1 : 323°·8 : 0″·6 : v.y., gold, '30. Bin. 46·0 years. Orbit elong. ellipse, principal star near centre. Bryant, '12 : 185°·3 : 0″·2 ; widening to 0″·9 (1819) at 154°, then closing.

A 2386. xvii^{h} 27^{m}·3, N. 2° 47′ : 6·5, 6·5 : 323°·6 : 0″·1 ±.

54 (Σ 2184). xvii^{h} 30^{m}·7, N. 13° 13′ : 6·3, 11·2 : 76°·8 : 21″·4 : y., o.

53 (Σ I 34). xvii^{h} 30^{m}·8, N. 9° 38′ : 5·6, 7·3 : 191°·4 : 41″·1. w. 7·3 decided bl., '50 ; 5·6 light y. : so Fr., '76.

Σ 2187. xvii^{h} 31^{m}·7, N. 4° 12′ : 8·3, 9·3 : 177°·6 : 3″·1.

Σ 2186. xvii^{h} 31^{m}·8, N. 1° 3′ : 7·5, 7·5 : 82°·7 : 2″·9.

Σ 2188. xvii^{h} 32^{m}·3, N. 6° 40′ : 8·5, 9·2 : 203°·8 : 5″·5.

Σ 2191. xvii^{h} 35^{m}·5, S. 4° 56′ : 7, 8 : 268°·2 : 26″·5. Ho., *comes* to 8, 12 : 32°·7 : 8″·3.

β 1251. xvii^h 38^m·4, N. 16° 0′ : 6, 11·5 : 79° : 1″·4. Doo., ’05 : 62°·4.

Σ 2200. xvii^h 39^m·9, N. 5° 53′ : 8, 8·8 : 168°·2 : 1″·7.

61 (Σ 2202). xvii^h 40^m·6, N. 2° 37′ : 5·5, 5·8 : 94°·1 : 20″·5 : w. W., greyish, *p* considerably the larger, ’50 ; a little larger, 9-in. spec., ’71, ’76, ’80. De., 5·5, 6·2.

Σ 2211. xvii^h 42^m·5, S. 1° 11′ : 8·2, 9·2 : 115°·5 : 9″·7.

Σ 2212. xvii^h 42^m·5, N. 5° 44′ : 8·5, 8·8 : 341°·5 : 3″·1.

Σ 2222. xvii^h 44^m·3, N. 14° 50′ : 7·5, 9·2 : 58°·6 : 2″·1.

Σ 2227. xvii^h 46^m·1, N. 5° 21′ : 8·8, 8·8 : 296°·5 : 19″·6. β, ’05 : 18″. In broad group, evidently a *family*.

OΣ 338. xvii^h 48^m·4, N. 15° 20′ : 6·6, 6·9 : 46° : 0″·7 : gold. Greenw., ’12 : 14°·4 : 0″·8. Lewis, pair 1^m *f*, 11′ *n* : 9, 9·5 : 292°·4 : 2″·3. Another, 1^m *p*, 10, 10·5 : 346°·6 : 1″·2. Bryant another in field, 282°·4 : 1″·4.

Σ 2235. xvii^h 48^m·8, S. 2° 15′ : 7·5, 9·1 : 123°·5 : 18″·4 : y., o. Fr., ’15 : 19″·2.

Hn. 139. xvii^h 50^m·5, S. 11° 37′ : 6·5, 10·3 : 154°·2 : 3″·7.

Σ 2244. xvii^h 53^m·0, N. 0° 4′ : 6·9, 7·1 : 272°·7 : 1″.

Σ 2252. xvii^h 55^m·0, N. 2° 3′ : 8, 8·3 : 22°·9 : 3″·8.

Σ 2254. xvii^h 55^m·3, N. 12° 27′ : 8·3, 8·7 : 266° : 3″·2.

67 (H*h*. 551). xvii^h 56^m·6, N. 2° 56′ : β, 5·6, 9 : 143° : 54″·7. β, *comites* to both ; 5, 14·8 : 195°·6 : 6″·8, and 8·3, 11·5 : 129°·6 : 8″·4, another, β, 12 : 178° : 45″·7. B., faint pair, *sp*. A short dist. *p*, a little *s*, must be h.’s ‘ very fine or. star,’ 7·5 m^g. 67, ysh., bl, ’50.

68 (β 1125). xvii^h 57^m·7, N. 1° 19′ : 5·1, 9·9 : 14°·9 : 1″. A., ’12 : 22°·6 : 0″·8.

τ (Σ 2262). xvii^h 58^m·7, S. 8° 11′ : 5, 5·7 : 192°·9 : 0″·3 : ysh., ’35. Bin. Ph., ’13 : 259°·6 : 2″·1.

OΣΣ 164. xvii^h 59^m·4, N. 7° 55′: De., 7·3, 8·2 : 2°·9 : 49″·8 : y.

Σ 2265. xviii^h 0^m·2, N. 6° 27′: 8·4, 9·4 : 282°·8 : 24″·5.

70 (Σ 2272). xviii^h 1^m·4, N. 2° 33′: 4·1, 6·1 : 148°·2 : 4″: y., purple, '25. Y., or., '50. Bin. 86·7 years. p.m. 1″·13. Dist. varies from 1″·7 to 6″·7 (Ha.), now widening. Ph., '14 : 142°·8 : 4″·2. P. Sm. thinks 6·1 var. in col. Fr., both y., '76. De., 6·1 generally red. 3 minute *comites* : 9-in. spec. '71.

Σ 2276. xviii^h 2^m·0, N. 12° 0′: 6, 7 : 257°·9 : 6″·8 : yw., blsh. w. W., ruddy, not $\frac{1}{2}$ m^g. diff. '50. De., 6·3, 7·2. Du., 6·4, 6·5 ; '68, '71. Fr., '15, $\frac{1}{2}$ m^g. diff. ; yw., blsh. w.

73 (Σ 2281). xviii^h 5^m·6, N. 3° 58′: 5·7, 7·2 : 259°·7 : 1″·5. Elong. ? '50. Bin. 160 years ? Very elongated ellipse. Bryant, '12 : 258°·2 : 0″·2. Now widening.

Σ 2283. xviii^h 5^m·7, N. 6° 8′: 7·2, 7·7 : 92°·7 : 1″·2. Bryant, '12 : 88°·2 : 0″·7.

Σ 2329. xviii^h 27^m·5, N. 6° 25′: 43°·3 : 4″·2.

Σ 2342. xviii^h 31^m·7, N. 4° 52′: 5·7, 8·5 : 12° : 26″·9. Fr., '14 : 5°·3 : 30″·0. β, *comes* 12·7 : 336°·2 : 9″·3.

Σ 2346. xviii^h 33^m·4, N. 7° 28′: 7·5, 9 : 282°·8 : 15″·4. Fr., '14 : 292°·4 : 22″·3. r.m.

Stars with Remarkable Spectra, and Variables.

W (var.). xvi^h 17^m·1, S. 7° 31′: 8·9<13·5 : 329^d·8 : Schönfeld.

V (var.). xvi^h 22^m·3, S. 14° 15′: 7–10·5 : 302^d·5 : IV : Du.

χ. xvi^h 22^m·4, S. 18° 17′: 5·2 : Hy. Har.

Es.-Birm. 459. xvi^h 23^m·4, S. 7° 25′: 6·2 : III : D'A.

T (var.). xvi^h 29^m·2, S. 15° 58′: 10–12·5 : 361^d : Pogson.

S (var.). xvi^h 29^m·6, S. 17° 0′: 8·3<13 : 233^d·8 : Pogson.

Es.-Birm. 465. xvi^h 34^m·7, S. 12° 10′: 8 : R. : Hn.

RR (var.). xvi^h 44^m·4, S. 19° 19′ : $8 < 12$: 298^d : Cape.

Es.-Birm. 472. xvi^h 46^m·9, S. 0° 20′ : 8 : R. : Hn.

SS (var.). xvi^h 53^m·7, S. 2° 36′ : 8·1–12 : 230^d : Anderson.

Nova 1. xvi^h 55^m·0, S. 12° 46′ : Hind, '48. Rose to 4 m^g. and faded to 12·5.

Var. xvii^h 1^m·1, S. 26° 29′ : 7·2–8 : Cannon.

R (var.). xvii^h 3^m·2, S. 15° 59′ : 7·1–13·6 : 302^d·2 : Pogson.

U (var.). xvii^h 12^m·5, N. 1° 18′ : 6–6·7 : 0^d·839 : Algol type. Gould. h., *comes*. β, 358°·8 : 20″·2.

Z (var.). xvii^h 15^m·5, N. 1° 36′ : 7·5–12·5 : 348^d : Fleming.

Es.-Birm. 486. xvii^h 15^m·7, N. 2° 13′ : 7 : III : D'A.

Es.-Birm. 490. xvii^h 22^m·3, N. 16° 59′ : 6·2 : III : Vogel.

Es.-Birm. 492. xvii^h 25^m·0, S. 19° 25′ : 7·8 : R. : h. IV. Du. Var. Es.

Nova 2. xvii^h 26^m·8, S. 21° 25′ : Möstlin, Kepler's scholar, 1604, at first surpassing Jupiter and even rivalling Venus, vanishing in 1¼ years. Chacornac, '61, mapped a 10 m^g., missed by some observers '71, recovered as 12 m^g. by Winnecke, '75, and apparently var.

Es.-Birm. 495. xvii^h 30^m·1, N. 14° 54′ : 6·2 : III : Vogel.

Es.-Birm. 497. xvii^h 30^m·5, N. 12° 35′ : 8·2 : R. : W.

Star. xvii^h 39^m·7, S. 6° 15′ : 8·8 : Hy. : Fleming.

Es.-Birm. 502. xvii^h 40^m·0, N. 4° 22′ : 8·1 : pale R. : W. III ? Es.

Es.-Birm. 501. xvii^h 40^m·2, S. 18° 37′ : 8·5 : R. : h. IV. Du. Var.

Es.-Birm. 503. xvii^h 43^m·5, S. 3° 37′ : 8·5 : R. : Hn. III.

RS (Nova ?). xvii^h 46^m·0, S. 16° 40′ : 7·7. Irregularly var., but increasing in '98 to 7·7 and showing the spectrum of a Nova. It has since sunk to 10, and shows usually spect. of class K. A similar outburst occurred in Z Andromedæ.

Y (var.). xvii^{h} 48^{m}·4, S. 6° 7′ : 6·1–6·5 : 17^{d}·1 : Sawyer.
Es.-Birm. 512. xviii^{h} 3^{m}·5, N. 6° 32′ : 7·5 : III : Vogel.
X (var.). xviii^{h} 34^{m}·5, N. 8° 45′ : 6·5–9 : 335^{d}. Es.

Clusters and Nebulæ.

6171 (H. VI 40). xvi^{h} 28^{m}·0, S. 12° 53′. Large pale cl., best with low power. Comparative desert *f.* See M. 19 *infra*, and a list of similar vacancies in App. I.

6218 (M. 12). xvi^{h} 43^{m}·1, S. 1° 48′ : resolvable. h., 10–16 m^{g}. E. of Rosse, slightly spiral; finely grouped.

6254 (M. 10). xvi^{h} 52^{m}·9, S. 3° 59′ : bright cl. h., 11–15 m^{g}. E. of Rosse, tendency to curved branches. A beautiful group lies *f*; *lucida* bright or.

6273 (M. 19). xvi^{h} 57^{m}·7, S. 26° 9′. A mass of stars; large, fairly bright, but very low. Near the large blank space in the body of Scorpio, where H. found scarcely any stars.

6333 (M. 9). xvii^{h} 14^{m}·5, S. 18° 26′. Small, apparently resolvable: 'a myriad of minute stars, clustering into a blaze in the centre, and wonderfully aggregated with numerous outliers' (Sm.). h., 14 m^{g}.

6402 (M. 14). xvii^{h} 33^{m}·4, S. 3° 12′. Large; glimpses of resolution, effected by H. with 20-ft. refl. (h., 15 or 16 m^{g}., 'the finest star dust.')

6494 (M. 23). xvii^{h} 52^{m}·2, S. 19° 1′. Grand low-power field. h., about 100 stars, 9–10 to 13 m^{g}. Announced by increasing number.

Fine region xviii^{h} 2^{m}·1, N. 4° 33′.

Curious sequence of small stars ± xviii^{h} 8^{m}·5, N. 4° 7′.

6572 (Σ 6). xviii^{h} 8^{m}·7, N. 6° 50′. Small, very bright. Considered by Σ one of the most curious objects in the heavens. h., slightly hazy. D'A., a little elliptical, 5″ or 6″, blsh. grn. Gaseous.

ORION.

The finest constellation in the heavens, equally remarkable for telescopic interest and obvious brilliancy; fortunately its position is very suitable for English observers, as it comes to the meridian in winter, and attains a sufficient but not an inconvenient altitude. Sweeping in many parts most beautiful.

α (Betelgeuze). v^{h} 50^{m}·8, N. 7° 24′ is irregular var. h., the discoverer, found it alternately above *β* (Rigel) and below *α* Tauri, from 1839, Nov. 26, to 1840, Jan. 7, losing nearly half its light; afterwards its changes were much less conspicuous till 1849. 1852, Dec. 5, Fletcher thought it brighter than Capella, which he rated clearly above Wega, so that it was then the brightest star in the N. hemisphere. He also saw it nearly approaching those stars, 1865, Dec. 25. When brightest Huggins and Miller find that a group of dark lines fades out of its spectrum, which is remarkable, like that of *β* Pegasi and others, for the *extreme faintness of the lines of hydrogen.* Huggins thinks it may be receding from us 22 miles per second. Lassell says of it, 'A most beautiful and brilliant gem! Singularly beautiful in colour, a rich topaz; in hue and brilliancy different from any other star I have seen.' Look at *α* and *β* alternately to appreciate the contrast. The spectrum is of Type III, but the bands under high dispersion are almost entirely resolved into innumerable fine lines. *β, comes,* 14·5 : 109°·5 : 39″·8. Three more distant. 20′ *s*, a little *p*, is Σ 817 : 8·2, 8·3 : 72°·4 : 18″·5.

Double Stars.

Σ 589. iv^{h} 40^{m}·6, N. 5° 9′ : 8, 8 : 310°·9 : 4″·5 : y.w., Furner, '11 : 293°·9. Beautiful.

β 883. IV^{h} 46^{m}·8, N. 10° 56′ : 7, 7 : Bin. 16·6 yrs. A., 1912 : 21°·3 : 0″·2. Angle increases. *Comes*, 13 : 154°·8 : 17″·8.

OΣΣ 55. IV^{h} 46^{m}·9, N. 5° 4′ : 8, 8·8 : De., 15°·9 : 37″·7. Webb ; ruddy, bl.

Σ 609. IV^{h} 47^{m}·7, N. 1° 2′ : 8·5, 8·7 : 82°·1 : 1″·9 : y. A., '99 : 74°·3.

Σ 612. IV^{h} 49^{m}·9, N. 7° 15′ : 7·6, 7·9 : 196°·9 : 16″·6.

Σ 614. IV^{h} 51^{m}·0, S. 0° 40′ : 8·5, 8·9 : 179°·9 : 2″·6. Do., '02 : 172°·1. Closely *sp* π^{6}.

Σ 620. IV^{h} 53^{m}·8, N. 13° 50′ : 8·4, 9·4 : 226°·3 : 3″·6.

OΣΣ 58. IV^{h} 54^{m}·4, N. 14° 26′ : 6·7, 9 : De., 304°·9 : 88″·9. Webb, white, bl., a 14 m^{g}. at 100″.

Σ 627. IV^{h} 56^{m}·4, N. 3° 30′ : 6·3, 7 : 260°·3 : 21″·3. Fr., nearly equal. De., 6, 7. A splendid pair. Fr., '15 : 258°·4 : 20″·6.

Σ 630. IV^{h} 57^{m}·8, N. 1° 30′ : 6·8, 8 : 49°·2 : 14″ : w., blsh. Se., 5·5, 7 : '56. De., 6·3, 7·7. 1° *f* π^{6}. A. doubles 8, 11 : 25°·2 : 0″·5.

14 (OΣ 98). V^{h} 3^{m}·5, N. 8° 23′ : 6, 6·8 : 217°·9 : 1″·2. Greenw., '12 : 155°·1 : 0″·8. Wa., pair *n*, a little *f*; Copeland, 11·2, 13·4 : 288°·4 : 10″·8. 6′ *s* is Σ 643 : 8·5, 8·5 : 295°·2 : 2″·7.

Σ 652. V^{h} 7^{m}·6, N. 0° 56′ : 6·3, 7·8 : 184°·3 : 1″·7.

ρ^{1} (Σ 654). V^{h} 9^{m}·1, N. 2° 21′ : 4·7, 8·5 : 63°·5 : 7″·1 : v.y., bl. 8·5 very small, '49, '56 : so Sims, '76. Jacob, 10, '56 ; so Main, '62. De., 4·5, 8·5. Ha., 5, 8.

OΣ 517. V^{h} 9^{m}·4, N. 1° 52′ : 6·5, 6·7 : 280° : 0″·7. A., '06 : 310°·8 : 0″·3. Ha., *comes*, 13 : 138°·2 : 6″·9.

Σ 664. V^{h} 9^{m}·8, N. 8° 21′ : 7·5, 8 : 167°·6 : 5″.

β (Σ 668). V^{h} 10^{m}·7, S. 8° 17′ : 1, 8 : 199°·8 : 9″·1 : yw., o. h., 8, pale red : so Kitchener. De., azure. Es., bl. I always see a blue tinge in the great star, resembling that of Wega. Sa., ysh. with reflector; blsh. achr., side by side. Beautiful object, and fair test for small telescope; but from low altitude often blotted with vapour. B. has seen 8 distinctly with $4\frac{1}{8}$-in. achr. just before sunset; β and Fr. have detected it with $1\frac{1}{4}$ in.; T. T. Smith with $1\frac{1}{2}$-in. silv. spec. β and Sa. elongated. Sometimes single and sometimes double with Lick 36-in. Perhaps a very rapid bin., never wider than 0″·2. Mitchel another *comes*, β, 1°·5 : 44″·5.

Σ 667. v^h 10^m·8, S. 7° 10′ : 7·5, 9 : 312°·7 : 4″·3 : v.y., ash. With sweeping power, a pale ruby.

Σ 678. v^h 13^m·4, N. 4° 36′ : 8·3, 8·8 : 96°·5 : 3″·3.

τ (β 188). v^h 13^m·7, S. 6° 55′ : 4, 11, 10·7 : 249°·2, 60° : 35″·2, 36″. *Comes* to 11 : 11·6 : 51°·4 : 4″. Fine test, well seen $11\frac{1}{4}$-in. spec. Next large star *n f* β.

Σ 688. v^h 15^m·6, S. 10° 49′ : 7, 7·4 : 274°·3 : 10″·5 : ysh., blsh., w.

Σ 692. v^h 16^m·6, S. 8° 6′ : 7·8, 8·8 : 4°·2 : 34″·9 : ysh., w. Fine wide object. β divides 7·8 : 8, 8·1 : De., 355°·3 : 0″·6.

Σ 693. v^h 17^m·6, S. 2° 7′ : 8·7, 9 : 8°·9 : 3″·6.

23 (Σ 696). v^h 18^m·6, N. 3° 25′ : 5, 7 : 28°·1 : 31″·7 : grnsh. w., w. Pale y , fine bl., '49 Beautiful col.

Σ 701. v^h 19^m·5, S. 8° 30′ : 6·7, 8·5 : 146° : 5″·9 : v.w., ash.

Winnecke 2. v^h 19^m·8, S. 0° 53′ : 6·5, 6·8 : 169° : 1″·6, '66. A., '04 : 160°·5 : 1″·9, who doubles 6·8 : 8, 8·1 : 141°·5 : 0″·2.

η (Dawes 5). v^h 20^m·5, S. 2° 28′ : 4, 5 : 87° : 1″ : w., purpsh. Ph., '14 : 80°·8 : 1″·2. Excellent test, but low. $5\frac{1}{2}$-in. with 212 sometimes split it. Buffham divides it with $4\frac{1}{2}$-in. of 9-in. spec. Fixed? Spect. Bin., 8^d. B., 4 *comites*. β, faint pair *sf*, 10, $10\frac{1}{4}$. 12$^{\mathrm{s}}$ *f*, 6′ *s*, is β 556 : 7, 11·3 : 239°·2 : 0″·9.

Σ 708. v$^{\mathrm{h}}$ 21$^{\mathrm{m}}$·0, N. 1° 52′ : 8·2, 9·8 : 323°·1 : 2″·6. 2$^{\mathrm{m}}$ *p*, 50′ *s*, two pairs, S. 479 : 5, 9 : or., bl. and Σ 700 : 8, 8·2 : 5°·3 : 4″·5 : w. Fr., ysh., blsh. '77. 36$^{\mathrm{s}}$ *p*, 26′ *n*, is Σ 702 : 8·8, 9·3 : 78°·6 : 8″.

Σ 710. v$^{\mathrm{h}}$ 21$^{\mathrm{m}}$·5, S. 11° 23′ : 8·2, 8·3 : 193°·6 : 10″·7.

Σ 712. v$^{\mathrm{h}}$ 22$^{\mathrm{m}}$·3, N. 2° 48′ : 7, 9 : (54°·5) : 3″·1.

ψ^2(Knott 3). v$^{\mathrm{h}}$ 22$^{\mathrm{m}}$·6, N. 3° 1′ : 5·5, 11 : 322°·3 : 2″·8 : y., fine bl. Well seen, β, $3\frac{1}{2}$-in. of 6-in. achr. : In a grand region. Sp. Bin. Quadr. in line 1$^{\mathrm{m}}$ *f*.

h. 702. v$^{\mathrm{h}}$ 24$^{\mathrm{m}}$·2, S. 2° 1′ : β, 8·3, 8·6 : 148°·3 : 24″·1. Secchi, pair in field, De., 8·5, 9 : 51°·3 : 5″·2. De., another ; 8·5, 10 : 358°·6 : 15″·7. Es., *comes*. Beautiful combination.

Σ 721. v$^{\mathrm{h}}$ 25$^{\mathrm{m}}$·4, N. 3° 5′ : 7, 9 : 24″·2 : w., o. Fr., 9 blsh., or purple, '77 : β divides *comes* : 9·5, 9·5 : 142°·5 : 0″·4.

31 (Σ 725). v$^{\mathrm{h}}$ 25$^{\mathrm{m}}$·6, S. 1° 9′ : 5·8, 11 : 87°·5 : 12″·7 : v. gold, o. Fr., 11 bl., '77, '79. 11 easy, $9\frac{1}{3}$-in. spec. Sa., underrated, clear bl. Buffham, $2\frac{1}{4}$-in. of $9\frac{1}{4}$-in. refl. De., 10·5. Gould, large star var. ? $4\frac{3}{4}$–6 ? Ar. strongly suspects var. in 9 m$^{\mathrm{g}}$. 25$^{\mathrm{s}}$ *f*, 3′ 48″ *n*.

Σ 726. v$^{\mathrm{h}}$ 26$^{\mathrm{m}}$·4, N. 10° 12′ : 8, 8·5 : 261° : 1″·2.

32 (Σ 728). v$^{\mathrm{h}}$ 26$^{\mathrm{m}}$·5, N. 5° 53′ : 5·2, 6·7 : 203°·7 : 1″ : ysh. A., '10 : 122°·0 : 0″·2.

33 (Σ 729). v$^{\mathrm{h}}$ 27$^{\mathrm{m}}$·0, N. 3° 14′ : 6, 7·3 : 25°·6 : 1″·9.

Σ 731. v$^{\mathrm{h}}$ 27$^{\mathrm{m}}$·3, S. 2° 9′ : 8·5, 9 : 331°·6 : 4″·6. Beautiful pair.

δ (Σ I 14). v$^{\mathrm{h}}$ 27$^{\mathrm{m}}$·9, S. 0° 21′ : 2, 6·8 : 359°·2 : 52″·7 : grnsh. w., w. Pale grn., pale violet or lilac, '49. W.y., pale lilac, or violet, '55. Fr., pale y., fine bl., '77. h., var. 2·2–2·7 ? Sp. bin. 5^{d}·7. β, *comes*, 14 : 226°·8 : 32″·4.

β 1048. v^{h} 28^{m}·6, S. 1° 39′ : 6·2, 10·7 : 358°·2 : 2″·2.

Σ 735. v^{h} 29^{m}·0, S. 6° 33′ : 8·5, 9 : 355°·2 : 30″·9. β, '01 : 351°·9 : 41″·6, from p.m.

Σ 734. v^{h} 29^{m}·1, S. 1° 46′ : 7, 8·6 : 356°·4 : 1″·8 ; *comes*, 8·6 : 243°·1 : 29″·3, doubled by β, 8·7, 9·7 : 296°·1 : 0″·8.

Σ 743. v^{h} 30^{m}·6, S. 4° 26′ : 6·9, 8 : 277°·8 : 1″·8.

λ (Σ 738). v^{h} 30^{m}·7, N. 9° 53′ : 5, 6 : (44°·3) : 4″·2 : ysh., purple. *Comes*, 12, β, 183°·1 : 28″·7 : seen 5½-in. Glimpsed, Wa., 2⅞-in. achr. Whole region very fine.

OΣ 111. v^{h} 30^{m}·8, N. 10° 11′ : 6, 10·2 : 351°·8 : 3″.

Σ 747. v^{h} 31^{m}·1, S. 6° 3′ : 5·6, 6·5 : 223°·1 : 36″ : ysh., ashy. Wa., *comes*, 14, *f* 5·6. 22^{s} *p* is Σ 745 : 8·5, 8·7 : 346°·5 : 28″·6. In group of ι.

42 (Dawes 4). v^{h} 31^{m}·4, S. 4° 53′ : 5, 9 : 220°·1 : 2″.

ι (Σ 752). v^{h} 31^{m}·5, S. 5° 57′ : 3·2, 7·3 : 142°·2 : 11″·3 : y.w., blsh. Sm., *comes*, 11 : 102°·8 : 48″·9. Field very fine. A glow with 5½-in. around this group, which E. of Rosse finds to occupy a singular dark opening, encompassed with neb. matter. Wa., minute pair between two brighter stars *n* in field—a test.

Σ 750. v^{h} 31^{m}·5, S. 4° 25′ : 6, 8 : 59°·2 : 4″·3 : w., ash.

45 (Hn. —). v^{h} 31^{m}·7, S. 4° 54′ : 6½, 12·7, 15 : 170°·2, 34°·4 : 19″·8, 19″·1.

Σ 751. v^{h} 31^{m}·7, S. 1° 3′ : 8, 8·7 : 123°·9 : 15″·5 : w. W., bl., '83, in field with ε.

Triplet. v^{h} 32^{m}·7, N. 0° 15′ : 9·75, 10, 10·25. Webb.

Σ 757. v^{h} 34^{m}·0, S. 0° 13′ : 8, 8·2 : 239°·8 : 1″·7 ; *f* is Σ 758 : 8·5, 9 : 297°·7 : 11″·1 : v.w. '31. De., 9 azure, certain, '57. Fr., blsh., '77. Star 8 m^{g}. *p*.

Pretty group *n*, a little *f* ε, pale green, which H. saw in large faint neb.

σ (Σ 762). v$^{\text{h}}$ 34$^{\text{m}}$·7, S. 2° 38′: 4·1, 10·3: 7·5, 7: 236°·5, 84°·5: 11″, 12″·9; 7·5 and 7: 230°·8: 30″: w., 3 ash. 4·1 y., '51; 7·5 ruddy, '69; bl., '83, $9\frac{1}{3}$-in. spec. De., 3·9, 9·5, 6·8, 6·3. Spec. Bin. short per. *Comes sp*, escaped some of the first observers, very plain now. β doubles 4·1, 6: 357°: 0″·3, '91. A., '07: 318°·6. Beautiful little triangle *np*, Σ 761: 7·9, 8·2, 8·7: 201°·6: 68″·1; 8·2, 8·7: 267°·8: 8″·3: all w.; a smaller *comes*, and 2 minute stars between the groups. Wa., sees all $2\frac{7}{8}$-in., and notes minute pair *n* of 4·1.

Σ 763. v$^{\text{h}}$ 34$^{\text{m}}$·9, N. 10° 14′: 8·2, 8·8: 320°·1: 5″·8: ysh., yw.

ζ (Σ 774). v$^{\text{h}}$ 36$^{\text{m}}$·7, S. 1° 58′: 2, 5·7: 153°·3: 2″·3: w. 5·7 singularly missed by H., and found by Kunowsky, seems of some nondescript hue, about which observers do not agree. Σ calls it 'olivacea subrubicunda'! 3rd star, 9, β, 9°·3: 57″·2.

Σ 790. v$^{\text{h}}$ 42$^{\text{m}}$·1, S. 4° 18′: 7, 9·3: 89°·1: 6″·8: rsh. y., bl.

Σ 792. v$^{\text{h}}$ 42$^{\text{m}}$·8, S. 3° 17′: 8·2, 8·7: 133°·9: 24″·9: ysh. Very pretty.

52 (Σ 795). v$^{\text{h}}$ 43$^{\text{m}}$·7, N. 6° 26′: 6·2, 6·2: 200°·1: 1″·7. Ysh., pale ysh. Bowyer, '12: 208°·5. In contact, 80, neatly split, 144: excellent test, readily found, about 2° *sp* α. Minute *comes n*, a little *f*, $9\frac{1}{2}$-in. spec.

Σ 798. v$^{\text{h}}$ 44$^{\text{m}}$·3, S. 8° 24′: 7·2, 9·2: 181°·4: 20″·7.

Σ 809. v$^{\text{h}}$ 46$^{\text{m}}$·6, S. 1° 27′: 7·7, 8·8: 101°·2: 25″·7: y., ash. β adds 10·3 to 7·7: 106°·0: 1″·2.

Σ 813. v$^{\text{h}}$ 48$^{\text{m}}$·5, N. 18° 56′: 8, 8: 148°·1: 3″·2.

OΣ 123. v$^{\text{h}}$ 49$^{\text{m}}$·7, N. 10° 14′: 7, 8·7: 175°·9: 2″·4: y., ash. Greenw., '12: 179°·8: 1″·9.

Σ 816. $\text{v}^{\text{h}}\ 50^{\text{m}}{\cdot}6$, N. 5° 51′ : 6·2, 8·7 : 289°·3 : 4″·2.

Σ 820. $\text{v}^{\text{h}}\ 51^{\text{m}}{\cdot}3$, N. 8° 59′ : 8·3, 8·8 : 110°·3 : 4″·7.

Σ 823. $\text{v}^{\text{h}}\ 53^{\text{m}}{\cdot}9$, S. 7° 39′ : 8·5, 9·2 : 339°·3 : 7″·5.

OΣ 125. $\text{v}^{\text{h}}\ 54^{\text{m}}{\cdot}9$, N. 22° 28′ : 7, 8·5 : 257°·2 : 1″·5. Red.

Σ 826. $\text{v}^{\text{h}}\ 54^{\text{m}}{\cdot}8$, S. 1° 20′ : 8·2, 9·2 : 115°·5 : 1″·8. Bowyer, ’12 : 122°·1.

μ (β 1056). $\text{v}^{\text{h}}\ 58^{\text{m}}{\cdot}0$, N. 9° 39′ : 4, 14 : 272° : 16″·8.

Σ 835. $\text{vi}^{\text{h}}\ 0^{\text{m}}{\cdot}3$, N. 18° 19′ : 8, 9 : 146°·6 : 2″·2 : yw., ash.

Σ 840. $\text{vi}^{\text{h}}\ 2^{\text{m}}{\cdot}0$, N. 10° 46′ : 8·5, 8·7 : 183°·5 : 0″·9. A., ’03 : 171°·1. A 6·2 : 247°·2 : 21″·1.

Σ 853. $\text{vi}^{\text{h}}\ 4^{\text{m}}{\cdot}7$, N. 11° 41′ : 7·8, 8·3 : 340°·1 : 24″·1. Doo., ’98 : 352°·6 : 28″·5. p.m.

Σ 855. $\text{vi}^{\text{h}}\ 4^{\text{m}}{\cdot}8$, N. 2° 31′ : 5·8, 6·8 : 113°·2 : 29″·3. Third star makes a beautiful group. Fr., 8·0, ’83; 10·0, ’11 ; 8·8, ’15.

Σ 859. $\text{vi}^{\text{h}}\ 5^{\text{m}}{\cdot}3$, N. 5° 41′ : 8, 8·5 : 249° : 31″·4. β, ’04 : 246°·8 : 36″·8. p.m.

Σ 867. $\text{vi}^{\text{h}}\ 7^{\text{m}}{\cdot}0$, N. 17° 24′ : 7, 8·5 : 156°·3 : 2″·2.

A.C. 3. $\text{vi}^{\text{h}}\ 7^{\text{m}}{\cdot}8$, S. 4° 39′ : 6·5, 9 : 174°·8 : 1″.

Σ 877. $\text{vi}^{\text{h}}\ 10^{\text{m}}{\cdot}1$, N. 14° 37′ : 7·2, 7·7 : 263°·3 : 5″·3.

Σ 880. $\text{vi}^{\text{h}}\ 11^{\text{m}}{\cdot}0$, N. 10° 36′ : 8, 8 : 53°·4 : 5″·4.

Σ 895 rej. $\text{vi}^{\text{h}}\ 16^{\text{m}}{\cdot}5$, N. 5° 47′ : 8–9, 11 : β, 58°·5 : 28″·9. h. ‘full ruby red, fine green by contrast.’ Blsh., ’78, so Fr., ’79.

Stars with Remarkable Spectra, and Variables.

α, δ, 31. See under Double Stars.

o^1. $\text{iv}^{\text{h}}\ 48^{\text{m}}{\cdot}2$, N. 14° 7′ : 5 : III : Se.

R (var.). $\text{iv}^{\text{h}}\ 54^{\text{m}}{\cdot}6$, N. 8° 1′ : 8·7–13·5 : $378^{\text{d}}{\cdot}5$: Hind.

Es.-Birm. 111. $\text{iv}^{\text{h}}\ 57^{\text{m}}{\cdot}5$, N. 6° 32′ : 9·2 : III : Pickering.

W (var.). $\text{v}^{\text{h}}\ 1^{\text{m}}{\cdot}2$, N. 1° 3′ : 6 : IV : Se. Var. Es.

V (var.). $\text{v}^{\text{h}}\ 1^{\text{m}}{\cdot}9$, N. 4° 0′ : $8{\cdot}4<14{\cdot}5$: 267^{d} : Boss.

Es.-Birm. 122. $\text{v}^{\text{h}}\ 10^{\text{m}}{\cdot}5$, S. 0° 39′ : 7 : pale R. : W. III.

Es.-Birm. 126. v^{h} 14^{m}·2, S. 8° 18′ : 8 : pale R. : W.
Es.-Birm. 131. v^{h} 19^{m}·4, S. 9° 24′ : 8·6 : R. : Schm. III ?
25. v^{h} 20^{m}·6, N. 1° 46′ : 4·7 : Hy. : Har.
S (var.). v^{h} 25^{m}·1, S. 4° 45′ : 8–14·3 : 413^{d} : Webb.
RT (var.). v^{h} 28^{m}·9, N. 7° 5′ : 8·7–10·6 : Fleming. IV.
T (var.). v^{h} 31^{m}·9, S. 5° 32′ : 9–13 : Bond.
Es.-Birm. 157. v^{h} 42^{m}·4, S. 5° 54′ : 9 : pale R. : W.
Es.-Birm. 161. v^{h} 49^{m}·3, N. 7° 9′ : 9·4 : pale R. : W.
U (var.). v^{h} 51^{m}·1, N. 20° 10′ : 5·5–12·5 : 375^{d} : Gore.
Star. vi^{h} 0^{m}·3, S. 6° 41′ : 6 : Hy. : Har.
Es.-Birm. 181. vi^{h} 15^{m}·5, N. 14° 41′ : 5·8 : OR. : B. III.

CLUSTERS AND NEBULÆ.

Group with three pairs, 1° ± p π^{2}, iv^{h} 47^{m}, N. 8° 46′.

Pretty field, with ψ^{1}, v^{h} 20^{m}·6, N. 1° 47′.

1976 (M. 42). v^{h} 31^{m}·0, S. 5° 26′. The Great Neb., one of the most wonderful objects in the heavens; readily visible to the naked eye, yet strangely missed, as Humboldt says, by Galileo, who paid great attention to Orion. Cysatus compared it telescopically with the comet of 1618. The telescope shows an irregular branching mass of greenish haze, in some directions moderately well defined where the dark sky penetrates it in deep openings: in others melting imperceptibly away over such an extent that Se., by moving his telescope rapidly to gain full contrast, has traced it in singular convolutions, and with a considerable break near σ through 5½° of Decl., and 4° of RA.—from ζ to 49, and probably H. V 38—a prodigious diffusion. Bond II also found it encompassed by a distant nebulous loop; and in various parts detected about 20 curved wreaths, indicating somewhat of a spiral structure, Its real nature was long a profound mystery. It resisted H.'s 40-ft. refl., in which it was one of the first objects viewed, and, together with the Andromeda, suggested to him the widely discussed Nebula Hypothesis, which would see here an unformed fiery mist, the chaotic material of future suns. h. found but the aspect of 'a curdling liquid, or a surface strewed over with flocks of wool, or the breaking up of a mackerel sky.' The E. of Rosse, with his 3-ft. refl., La., with his 2-ft. spec. in the Maltese sky, could advance no further; it was long believed that the 6-ft. mirror of the E. of Rosse had lifted the veil, and distinguished in some places its starry composition; Bond, too, arrived at the same conclusion; and Se. with smaller, but very perfect means, thought he could detect the glittering 'star dust.' Yet, though this would imply a permanent form, there were strange discrepancies in the drawings of the best hands. h., in England, the same observer at the Cape of Good Hope, Bond, La., Liapounov with a 9½-in. achr. at Kazan, $O\Sigma$, at Poulkova, all differ in various ways; the latter even believed that the brightness of the central part was in a state of continual variation; and the subsequently published labours of Rosse, La., and Se., are far from correspondent in detail.[1] All this is strange; and the spectrum analysis of Huggins has only added to the wonder by exhibiting it as a mass of incandescent gases.[2] In the densest part, four stars, 6, 7, 7·5, 8 m^g., form a trapezium known as θ Orionis. Sm. gives their colours pale w., faint lilac, garnet, reddish. β and Gore have seen them with 1½-in. Σ., in 1826, discovered a fifth star, which is believed to have become visible only of late years; perhaps it may be brightening, as it has been seen with $3\frac{8}{10}$-in., and, it has been said, even with 2⅞-in. Bond's 15-in. achr. has shown it in full daylight. E. of Rosse sees it very red. h. added a 6th still smaller near the brightest star, 1830, Feb. 13, with South's 11¾-in. achr. Both have been thought var. β has seen both with 3-in.; T. T. Smith with 3 in. of silvered mirror. Two or three other most minute points have occasionally been detected. A. G. Clark, however, added a 7th within the trapezium, with the 36-in. achr., at the Lick Observatory, and Barnard has caught another, and has found a minute and difficult pair just outside. β gives the following positions for the stars.

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[1] The photographic plate will in time show whether any part is variable. With lenses of short focus the nebula seems on the plates to extend over the greater part of the constellation.

[2] Here and in H. IV 18, Androm., he sees a 4th line, and in the photo spectrum there are many others. Several nebulæ show but one, probably through their faintness. The words of Seneca, aptly quoted by Humboldt, are applicable to these mysterious objects: 'Rerum natura sacra sua non simul tradit. Initiatos nos credimus; in vestibulo ejus hæremus. Illa arcana non promiscue nec omnibus patent, reducta et in interiore sacrario clausa sunt: ex quibus aliud hæc ætas, aliud quæ post nos subibit, dispiciet. Tarde magna proveniunt.'

A B, 32°·3 : 8″·7. A C, 131°·3 : 12″·9. D C, 240°·6 : 13″·3. A E (Σ star), 351°·5 : 4″·3. C F (h.'s star), 120°·9 : 4″. D G (Clark's star), 270°·5 : 7″·0. Barnard's star could not be measured, but his star, A H, 178°·4 : 7″·9, which is double, 16, 16·5 : 274° : 1″·3, of which β says, 'It is infinitely more difficult than any double star I have ever attempted to see or measure.' OΣ thinks that several involved stars are subject to change,[1] and remarks that 'the existence of so many variable stars on such a small space in the central part of the most curious nebula in the heavens must of course induce us to suppose these phenomena intimately connected with the mysterious nature of that body.' A considerable aperture will show how beautifully one large star, nearly opposite the great dark opening, is encompassed by a spiral mass of haze. Clear weather must of course be chosen, and the lowest power which will bring out the trapezium is most likely to give a satisfactory contrast with the exterior darkness.

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[1] Over 100 have been found var. in this region by Leavett and Wolf by means of photography.

1981 (h. 362). v$^{\rm h}$ 31$^{\rm m}$·6, S. 4° 24′. Brilliant field, containing Σ 750 and Σ 743, *supra*. A grand neighbourhood; sweep well over the whole space, from 42 to ι, which star large apertures involve in haze, connected by a long faint loop with the Great Nebula.

2022 (H. IV 34). v$^{\rm h}$ 37$^{\rm m}$·7, N. 9° 2′. Small, distinct, faint, blsh., plan. Gaseous.

2024 (H. V 28). v$^{\rm h}$ 37$^{\rm m}$·8, S. 1° 54′. Faint, but extensive neb. immediately *f* ζ; D'A., 4 large patches. 2 with 9⅓-in. spec. Gaseous.

2068 (M. 78). v$^{\rm h}$ 42$^{\rm m}$·6, N. 0° 2′. Singular 'wispy' neb., easily found by sweeping 14$^{\rm m}$ *f* δ, 20′ *n*. Best defined *n*, E. of Rosse spiral? D'A., 6′ or 7′, enclosing pair, β, 9·5, 9·5 : 201°·8 : 50″·7. Sm., 8·5, 9 : stars much smaller, '50, '56, '64. D'A., 9, 10, '55; 10, 10, '64. Fr., 11, 12, '79. β, *n* star double, 9, 11·5 : 85°·3 : 1″. h., 3rd star. D'A., var. 12–14? 4$^{\rm m}$ *p*, 3′ *s* is Σ 782 : 7·8, 8·3 : 309°·4 : 36″·2 : w. Lick photo not spiral, but with two other neb. masses in field.

2169 (H. VIII 24). vi$^{\rm h}$ 4$^{\rm m}$·3, N. 13° 58′. Triangular cl., containing Σ 848 : 7·5, 8·5 : 2″·4 : lucid w., 1° *s* of ν. 'These gatherings, occurring indifferently upon the *Via Lactea* and off it, awaken still more our admiration of the stupendous richness of the Universe, in every department of which there appears such a profusion of creation, if we may so express ourselves of the works of the ALMIGHTY, in which our utmost ken has yet never detected any redundancy much less anything made in vain' (Sm.).

PEGASUS.

A constellation easily recognized by the great square which three of its principal stars form with that in the head of Andromeda.

Double Stars.

Σ 3061. 0^{h} 1^{m}·6, N. 17° 23′ : 8, 8 : 148°·4 : 7″·6. 14′ *n* is Σ 3060 : 8·5, 8·5 : 110°·5 : 3″·9. Ph., '14 : 122°·3.

Σ 67. 0^{h} 47^{m}·9, N. 10° 10′ : 8·3, 9 : 13° : 1″·6. Bowyer, '12 : 0″·8.

Σ 2767. xxi^{h} 6^{m}·8, N. 19° 38′ : 7·8, 8·2 : 30°·6 : 2″·5.

1 (Σ II 11). xxi^{h} 18^{m}·4, N. 19° 28′ : 4·5, 8·6 : 311°·2 : 36″·2 : v.y., o. Or., bl. '49. 4·5, var. ? c.p.m. P. Sm., *comes*, 14·5 : 22°·6 : 80″·7.

Σ 2797. xxi^{h} 22^{m}·8, N. 13° 20′ : 6·7, 8·2 : (217°·1) : 3″·2 : v.w., ash.

Σ 2799. xxi^{h} 25^{m}·6, N. 10° 44′ : 6·6, 6·6 : 322°·9 : 1″·4 : ysh. Greenw., '11 : 291°·2. Beautiful.

Σ 2804. xxi^{h} 29^{m}·3, N. 20° 21′ : 7·3, 8 : 316°·9 : 2″·9. β, '05 : 235°·7. Very beautiful.

3 (Σ I 56). xxi^{h} 33^{m}·7, N. 6° 16′ : 6, 7·4 : 349°·4 : 39″·1 : w. W., pale bl., '50. P. Sm. thinks col. of 7·4 var. De., 5·5, 6·8. A pretty pair in field ; OΣ 443 : 8, 8·3 (De., 8·9, 9·2) : 349°·3 : 7″·9.

OΣ 445. xxi^{h} 35^{m}·6, N. 20° 22′ : 8, 8·5 : 113°·1 : 0″·8.

ε. xxi^{h} 40^{m}·2, N. 9° 31′ : 2·5, β, 11·5, 8·8 : 325°·2, 321°·4 : 81″·4, 140″·3. Pale y., o, bl., '47. This object, when near the meridian, will exhibit a phenomenon, noticed by h.—the pendulum-like oscillation of a small star in the same vertical with a large one, when the telescope is swung from side to side. This, he thinks, is due to the longer time required for a fainter light to affect the retina, so that the reversal of motion is first perceived in the brighter object. I have seen this strikingly in δ and ζ Orion., and δ Herc.

κ (Σ 2824). xxi^{h} 41^{m}·0, N. 25° 17′ : 3·9, 10·8 : 308°·5 : 11″ : ysh., o. Lewis, 297°·4 : 12″·8. De., *comes* var. ? β divided 3·9 : 4·8, 5·3 : rapid Bin. Per., 11·5 years. Dist. never exceeds 0″·2. 3·9 spect. Bin. Per., 6^{d}. A remarkable system.

Σ 2828. xxi^{h} 45^{m}·5, N. 3° 1′ : 8, 9 : 142°·5 : 23″·8. β, '04 : 27″·6. *Comes* to 9, 9·2 : 37° : 3″·6. β, *comes* 14 : 75°·5 : 10″·3.

Σ 2829. xxi^{h} 45^{m}·9, N. 30° 23′ : 8·2, 8·9 : 15°·6 : 17″·1.

Σ 2841. xxi^{h} 50^{m}·5, N. 19° 20′ : 6·5, 8 : 111° : 22″·2. v.y., bl.

OΣ 452. xxi^{h} 51^{m}·7, N. 6° 52′ : 7·7, 8·8 : 179°·1 : 1″·2.

Σ 2848. xxi^{h} 54^{m}·0, N. 5° 33′ : 7·2, 7·5 : 54°·9 : 10″·4 : w., ysh. or red. '*Colores indubii*,' '29. D., v.w., '41. De., w., '63, '70. Fr., as Σ '76. Vogel, both y.w. '80.

Σ 2854. xxii^{h} 0^{m}·5, N. 13° 16′ : 7·7, 8 : 83°·1 : 3″·1.

Σ 2857. xxii^{h} 2^{m}·2, N. 9° 43′ : 7, 8·7 : 113°·8 : 19″·5 : w., ash.

Σ 2861. xxii^{h} 2^{m}·2, N. 20° 25′ : 7·7, 8·2 : 219°·9 : 7″·1.

Σ 2868. xxii^{h} 5^{m}·6, N. 22° 9′ : 8·3, 8·8 : 5°·1 : 1″·1.

π^1. xxii^{h} 5^{m}·7, N. 32° 47′ : 5 : forms a grand pair with π^2, 4 m^{g}., both y. Sm., 2 dist. *comites*, β, 3rd fainter. Es., pair, 12′ *n* : 10, 10·2 : 261°·5 : 1″·6.

Σ 2867. xxii^{h} 6^{m}·1, N. 7° 34′ : 7·9, 9 : 208°·1 : 10″·5 : ysh., blsh.

Σ 2869. xxii^{h} 6^{m}·5, N. 14° 14′ : 5·8, 11·8 : 253°·7 : (21″·3) : v.y., o.

Σ 2877. xxii^{h} 10^{m}·5, N. 16° 48′ : 6·4, 9·6 : 316°·4 : 7″·6 : y., bl. β, '03 : 2°·4 : 11″·9. p.m.

Σ 2878. xxii^h 10^m·5, N. 7° 35′ : 6·5, 8 : 130°·8 : 1″·4. Hu., ’02 : 126°·4. Wa., faint star *np*.

Σ 2881. xxii^h 10^m·9, N. 29° 11′ : 7·7, 8·2 : 111°·4 : 1″·8 : ysh., blsh., w. Greenw., ’12 : 96°·2.

30 (h. 962). xxii^h 16^m·4, N. 5° 23′ : *β*, 6, 11·8, 12·3 : 20°·7, 222°·8 : 6″·3, 10″·1. *β*, ’03 : 11″·6.

32 (Ho. 615). xxii^h 17^m·6, N. 27° 56′ : 5 : has double *comes* : 9·3, 11 : 18°·3 : 2″·4.

33 (*Σ* 2900). xxii^h 19^m·8, N. 20° 27′ : 6, 9·2 : 180°·7 : 2″·5 : y., o. Bowyer, ’12 : 173°·5. Dist. 7·9, being left behind. Fr., ’14 : 321°·4 : 69″·3.

Σ 2901. xxii^h 20^m·4, N. 3° 25′ : 8·5, 9·1 : 147°·1 : 2″·8.

34 (*β* 290). xxii^h 22^m·5, N. 3° 59′ : 5·8, 11·7 : 218°·7 : 2″·7.

Σ 2905. xxii^h 23^m·3, N. 14° 44′ : 8·5, 8·5 : 283°·8 : 3″·3.

Σ 2908. xxii^h 24^m·3, N. 16° 51′ : 7, 8·7 : 116°·3 : 8″·9 .

Σ 2910. xxii^h 24^m·4, N. 23° 7′ : 8·3, 8·8 : 347°·2 : 5″·3. Bowyer, ’03 : 339°·1.

37 (*Σ*2912). xxii^h 25^m·9, N. 4° 1′ : 5·8, 7·2 : 112°·6 : 1″·2 : ’31. Bin. with orbit in line of sight, now widening. Per., about 100 yrs. Bryant, ’11 : 112°·3 : 0″·3.

Σ 2915. xxii^h 28^m·6, N. 7° 0′ : 8·5, 8·7 : 169° : 12″·3. Fr., ’14 : 148°·4 : 12″·7.

Σ 2920. xxii^h 30^m·5, N. 3° 48′ : 7·1, 8·2 : 144° : 13″·6.

Ho. 296. xxii^h 36^m·9, N. 14° 7′ : 5·5, 5·5 : Doo., 64°·5 : 0″·3.

Σ 3134. xxii^h 37^m·0, N. 29° 34′ : 9, 9·3 : 76°·2 : 6″·1.

Σ 2934. xxii^h 38^m·0, N. 21° 0′ : 8·2, 9·2 : 187°·8 : 1″·2. Bowyer, ’12 : 126°·8 : 0″·8.

η (H*h*. 775). xxii^h 39^m·2, N. 29° 48′ : 3, has like *ε*, a blsh. 10 m^g. *comes*, but the large star is pale y. Schm. thinks its tint var., more or less red in different years. Spect. Bin. *β* doubles *comes* : 10·1 : 10·1 : 83°·3 : 0″·3.

ξ (h. 301). XXII^h 42^m·7, N. 11° 46′: De., 4, 12: 117°·7: 12″·2, '66. β, '99: 109°·6. Ticehurst points out pretty pair, 21′ *n*, 10^m *f*, Σ 2958: 7·2, 9·5: 6°·8: 3″·9: nearest of wide double in finder.

Σ 2945. XXII^h 45^m·9, N. 30° 54′: 8·5, 8·5: 292°·6: 3″·9.

Σ 2952 (rej.). XXII^h 50^m·4, N. 27° 36′: 7·5, 10: w., bl. β, 137°·0: 17″·1.

Σ 2954. XXII^h 50^m·8, N. 14° 46′: 9, 9: 28°·6: 36″·7.

52 (OΣ 483). XXII^h 55^m·2, N. 11° 18′: 6·2, 7·7: 196°·1: 1″·2: w., r. Bowyer, '12: 233°·3: 0″·5.

Σ 2974. XXIII^h 1^m·2, N. 32° 57′: 8, 8: 159°·7: 2″·8.

Σ 2978. XXIII^h 3^m·6, N. 32° 24′: 6·8, 8: 146°·2: 8″·4: w., blsh. Several little pairs similar to each other lie dispersed in this region.

57 (Σ 2982). XXIII^h 5^m·5, N. 8° 15′: 5·9, 10·2: 198°·1: 32″·6: gold, o. III type spectrum.

h. 3176. XXIII^h 8^m·9, N. 12° 7′: 9, 9: β, 164°·6: 26″·8.

Σ 2990. XXIII^h 9^m·3, N. 21° 39′: 8·5, 8·5: 69°·1: 1″·6. Bowyer, '12: 244°·3: 1″·7.

Σ 2991 (rej.). XXIII^h 9^m·4, N. 10° 38′: 6, 10: y., bl. Miller, 358°·7: 33″·7.

Σ 2997. XXIII^h 13^m·0, N. 20° 58′: 8·5, 9: 223°·1: 24″·4.

Σ 3000. XXIII^h 14^m·8, N. 24° 46′: 8·7, 8·8: 52°·3: 3″·2.

OΣ 494. XXIII^h 16^m·8, N. 21° 31′: 7·4, 8·1: 83°·6: 3″·3.

Σ 3006. XXIII^h 17^m·3, N. 35° 0′: 8·5, 9: 182°·8: 4″·6. β, '05: 166°·8: 5″·4. r.m.

64 (β 718). XXIII^h 18^m·0, N. 31° 22′: 5½, 7½; 86°·9: 0″·5.

Σ 3007. XXIII^h 18^m·8, N. 20° 7′: 6·5, 9·5: 79°·2: 5″·7.

Σ 3013. XXIII^h 23^m·6, N. 16° 11′: 7·8, 9·3: 270°: 2″·6. At 52″ is Σ 3012: 8·7, 8·8: 190°·8: 2″·6.

OΣ 497. XXIII^h 26^m·9, N. 9° 2′: 7·9, 8·6: 213°·1: 1″·3.

Σ 3021. XXIII^h 27^m·4, N. 15° 46′: 7·7, 8·9: 308°·9: 8″·3: w., ashy.

72 (β 720). xxiii^{h} 30^{m}·0, N. 30° 53′ : 6, 6 : 127°·7 : 0″·4 : '78. Furner, '08 : 177° : 0″·5.

OΣ 503. xxiii^{h} 38^{m}·0, N. 19° 51′ : 7·2, 7·8 : 132°·6 : 1″·8.

78 (A.G.C. 14). xxiii^{h} 40^{m}·0, N. 28° 55′ : β, 5, 8·1 : 197° : 1″·4.

Σ 3041. xxiii^{h} 43^{m}·8, N. 16° 38′ : 8·1, 8·2 : 183°·4 : 3″·3. A 7·3 : 347°·6 : 71″·1. Hu., '02 : 350°·8 : 64″·5.

Σ 3044. xxiii^{h} 48^{m}·9, N. 11° 29′ : 6·9, 7·3 : 282°·1 : 18″·6. v.w. Fr., '14 : 19″·2 : ysh., blsh. W., pale bl., '50–1, not quite alike, '56. Σ found the diff. of m^{gs}. vary a whole m^{g}. The period of this change should be investigated. De., 6·3, 7.

85 (β 733). xxiii^{h} 57^{m}·9, N. 26° 40′ : 6, 11·2 : 274° : 0″·7. Bin., 25·7 yrs. Greatest dist. at 155°, 1917 ±. A 9 m^{g}. ('05 : 339°·2 : 41″·5) is being rapidly left behind from large p.m. of 85, 1″·3 annually.

Stars with Remarkable Spectra, and Variables.

2. xxi^{h} 26^{m}·3, N. 23° 17′ : 4·5 : OR. : III : D'A.
7. xxi^{h} 38^{m}·2, N. 5° 19′ : 5·8 : Ry. : III : Vogel.
Star. xxi^{h} 47^{m}·2, N. 12° 15′ : 7·7 : Hy. : Fleming.
RX (var.). xxi^{h} 52^{m}·6, N. 22° 30′ : 8·1 : IV : Fleming.
Es.-Birm. 721. xxi^{h} 56^{m}·1, N. 23° 33′ : Σ 2850 (7·2, 11·2 : 263°·3 : 2″·8) : Rsh. gold. III. Es.
V (var.). xxi^{h} 57^{m}·0, N. 5° 44′ : 8·2<14 : 303^{d} : Fleming.
Es.-Birm. 722. xxii^{h} 0^{m}·4, N. 27° 58′ : 7·7 : Ruddy or. : h. III. D'A.
T (var.). xxii^{h} 5^{m}·0, N. 12° 9′ : 8·5<13 : 373^{d}·9 : Hind.
Es.-Birm. 726. xxii^{h} 13^{m}·5, N. 4° 44′ : 7·8 : R. : Lamont. III : Es.
31. xxii^{h} 17^{m}·6, N. 11° 48′ : 4·9 : Hy. : Fleming.
β (var.). xxii^{h} 59^{m}·9, N. 27° 39′ : 2·2–2·7 : Schm. III.
R (var.). xxiii^{h} 2^{m}·6, N. 10° 7′ : 7·5–13·2 : 377^{d}·5 : Hind.

55. xxiii^{h} 3^{m}·0, N. 8° 58′ : 5·2 : III : Se.
W (var.). xxiii^{h} 15^{m}·7, N. 25° 50′ : 7·5–13·5 : 341^{d} : Anderson.
S (var.). xxiii^{h} 16^{m}·5, N. 8° 29′ : 7·8–12·9 : 317^{d}·5 : Marth.
71. xxiii^{h} 29^{m}·5, N. 22° 6′ : 6 : Rsh. : III : D'A.
77. xxiii^{h} 39^{m}·3, N. 9° 53′ : 5 : R. : B. III : D'A.

Cluster and Group.

7078 (M. 15). xxi^{h} 26^{m}·1, N. 11° 49′. Bright and resolvable (h. 15 m^{g}.), blazing in centre; a glorious object with 9⅓-in. 'With' mirror. Very fine specimen of a completely insulated cl., discovered by Miraldi, 1745. Buffham, with 9-in. spec. finds a dark patch near the middle, with 2 faint dark 'lanes' or rifts, like those in M. 13, unnoticed by h. or D'A. 51 vars. have been found in this cluster.

Bright group. xxi^{h} 56^{m}·5, N. 7° 14′.

PERSEUS.

Here again we enter upon one of the most splendid portions of the Galaxy. Night after night the telescope might be employed in sweeping over its magnificent crowds of stars, among which many beautiful pairs, with the aspect of connection, would be found. This constellation includes the most conspicuous of, at least, the regularly variable stars, β, or Algol (iii^{h} 3^{m}·0, N. 40° 39′), which changes in 2^{d}·867, the increase and decrease together occupying not more than 7^{h}, the minimum only 18^{m}; so that it usually appears 2 m^{g}. Pickering has shown theoretically that the variation is due to a dark companion, and Vogel has found displacement in the lines of the spectrum showing the revolution of a dark and bright star round their common centre of gravity. Schr. discovered, 1787, a *comes*, sometimes invisible. β, 192°·5 : 81″·9, who adds a faint *comes* to this : 10, 12·5 : 114°·6 : 10″·5, and finds two fainter and closer *comites* to Algol at 155°·3, 144°·6 : 58″·7, 67″·7.

Double Stars.

Σ 213. 11^{h} 3^{m}·9, N. 50° 42′ : 8·5, 9 : 320° : 1″·9. β, *comes*, 12·5 : 61°·2 : 7″.

5 (β 874). 11^{h} 5^{m}·9, N. 57° 16′ : 6·3, 12·5 : 271°·3 : 5″·3.

Σ 235. 11^{h} 11^{m}·6, N. 55° 32′ : 8·5, 9 : 43°·4 : 1″·7.

Σ 249. 11^{h} 16^{m}·5, N. 44° 14′ : 7, 9 : 194°·7 : 2″·3 : v.w., ash.

9 (β 874). 11^{h} 16^{m}·8, N. 55° 29′ : 5·5, 12·3 : 161°·4 : 11″·7.

Star (β —). 11^{h} 18^{m}·3, N. 50° 0′ : 6·4, 14·5 : 121°·9 : 8″·3.

Σ 260. 11^{h} 20^{m}·9, N. 53° 55′ : 8·2, 8·7 : 348°·1 : 6″·6.

Σ 268. 11^{h} 23^{m}·7, N. 55° 11′ : 6·9, 8·2 : 129°·1 : 2″·7 : w., bl.

Σ 272. 11^{h} 27^{m}·2, N. 58° 5′ : 8·2, 8·2 : 42°·3 : 1″·7. Storey, ’09 : 37°.

Σ 279. 11^{h} 30^{m}·7, N. 36° 52′ : 6, 11 : 71°·2 : 16″·9 : gold, o.

β 521. 11^{h} 36^{m}·6, N. 47° 55′ : 6·2, 11·2 : 154°·5 : 5″·6.

OΣ 44. 11^{h} 37^{m}·1, N. 42° 21′ : 7·8, 8·5 : 58°·6 : 1″·5 : blsh. *nf* is h. 2155 : De., 7·6, 10 : 321°·2 : 17″·2.

Espin 8. 11^{h} 37^{m}·3, N. 53° 11′ : 5, 14 : 42°·6 : 12″·8.

12. 11^{h} 37^{m}·5, N. 39° 54′ : 6, y., has two pairs in large fields, one Σ 292 : 7·5 8·2 : 210°·7 : 23″·1. Other wider.

θ (Σ 296). 11^{h} 38^{m}·7, N. 48° 53′ : 4·2, 10 : 294°·6 : 15″·4 : y., o. Fr., ’16 : 302°·1 : 18″. OΣ., 3rd star : 9·6 : Fr., ’16 : 227°·8 : 75″·4, being rapidly left behind.

Σ 297. II^{h} 39^{m}·7, N. 56° 13′ : 8, 8·3 : 276°·6 : 15″·6. β, *comes*, 10·6 : 106°·1 : 28″·5.

Σ 301. II^{h} 41^{m}·9, N. 53° 36′ : 7·3, 8·3 : 16°·6 : 8″·2 ; ysh., blsh.

β 9. II^{h} 42^{m}·1, N. 35° 13′ : De., 6·3, 8·4 : 167°·5 : 2″.

η (Σ 307). II^{h} 44^{m}·8, N. 55° 34′ : 4, 8·5 : 300°·4 : 28″ : v.y., v. bl. Barlow, β, Wa., 5 faint *comites* ; Wa., β, one double : 114° : 5″·3.

Σ 314. II^{h} 47^{m}·1, N. 52° 40′ : 6·9, 7·1 : 295°·4 : 1″·5. β, ’00 : 303°·3 : 1″·5.

Σ 316. II^{h} 47^{m}·1, N. 36° 58′ : 8·5, 8·7 : 134°·3 : 13″·9.

OΣ 48. II^{h} 47^{m}·9, N. 48° 15′ : 6·4, 10·5 : 316°·9 : 6″·8.

20 (Σ 318). II^{h} 48^{m}·6, N. 38° 1′ : 5·5, 10 : 236°·8 : 14″·1 : y.w., o. ‘Neat test object’ (Sm.) which $3\frac{7}{10}$-in. showed readily, and Gore saw readily with 3-in. De., 5·2, 9·2. β divided 5·5 : 6, 7 : 158°·7 : 0″·2, ’78. Bin. Per., 33·3 yrs. Bryant, ’11 : 316°·7 : 0″·2. Probably never wider than 0″·52.

Σ 331. II^{h} 54^{m}·1, N. 52° 3′ : 5·3, 6·7 : 85° : 12″·2 ; w., blsh. Visible to naked eye, forming triangle with γ and τ.

Σ 336. II^{h} 56^{m}·6, N. 32° 6′ : 6·5, 8 : 8°·6 : 8″·2 : y. bl.

κ (Espin). III^{h} 4^{m}·1, N. 44° 33′ : 4, 13·5 : 333°·9 : 21″·8.

Σ 360. III^{h} 7^{m}·1, N. 36° 55′ : 7·8, 8 : 146°·4 : 1″·3 : ysh. Greenw., ’11 : 132°·5.

OΣ 51. III^{h} 7^{m}·5, N. 43° 59′ : 7·9, 8·1 : 300° : 1″·4.

Σ 364. III^{h} 8^{m}·4, N. 38° 51′ : 8·5, 8·5 : 310°·5 : 11″·4.

Espin 11. III^{h} 9^{m}·6, N. 56° 51′ : 5·5, 13·7 : 65°·7 : 10″·8.

Hu. 544. III^{h} 10^{m}·7, N. 50° 40′ : 6·5, 8·8 : 97°·7 : 0″·6.

Σ 369. III^{h} 11^{m}·9, N. 40° 11′ : 6·5, 7·8 : 28°·8 : 3″·3 : yw., blsh. w.

Σ 382. III^{h} 19^{m}·5, N. 33° 16′ : 7, 10·5 : 154°·5 : 3″·6 : y., o. 7 var. ? De., 5, 6, 7, 7·5. β, 6.

Σ 388. III^{h} 22^{m}·9, N. 50° 10′ : 8·2, 9·2 : 210° : 2″·9.

OΣ 55. III^{h} 23^{m}·8, N. 46° 39′ : 6·2, 11 : 292°·1 : 26″·1. A., *comes* double : 10·8, 13·8 : 235°·8 : 3″·5.

Σ 391. III^{h} 23^{m}·7, N. 44° 47′ : 7·3, 8 : 94°·8 : 3″·8 : w., purpsh.

34 (β 1179). III^{h} 23^{m}·9, N. 49° 15′ : 5·9, 11·6 : 163°·4 : 0″·7.

Σ 413. III^{h} 30^{m}·4, N. 33° 25′ : 8·5, 8·5 : 130°·3 : 2″·5.

β 533. III^{h} 30^{m}·6, N. 31° 25′ : 7, 7 : 149°·3 : 0″·4. Furner, '11 : 46°·9.

OΣ 59. III^{h} 35^{m}·1, N. 45° 46′ : 7·5, 7·8 : 349°·5 : 2″·4 : rsh.

Σ 425. III^{h} 35^{m}·1, N. 33° 52′ : 7·3, 7·3 : 104°·6 : 2″·9. Ph., 89°·2 : 2″·4 : '14.

Σ 426. III^{h} 35^{m}·6, N. 38° 52′ : 7, 8·5 : 340°·6 : 19″·7. β, *comes* to 8·5, 13·5 : 37°·2 : 12″·6.

40 (Σ 431). III^{h} 37^{m}·3, N. 33° 43′ : 4·2, 9·5 : 237°·2 : 20″.

β 1182. III^{h} 38^{m}·4, N. 48° 16′ : 6·4, 14·2, 13·5 : 261°·2, 242°·6 : 4″·4, 19″·3.

Σ 434. III^{h} 38^{m}·7, N. 38° 8′ : 7, 7·8 : 88°·2 : 28″·3 : gold, blsh. β, '03 : 85°·7 : 30″·6. p.m.

o (β 535). III^{h} 39^{m}·3, N. 32° 2′ : 4, 8·5 : 60°·5 : 1″. Bowyer, '12 : 42° : 0″·7.

Σ 439. III^{h} 39^{m}·5, N. 31° 55′ : 8, 9·2 : 38°·1 : 23″ : ysh., o. β divides 8 : 8·4, 8·4 : 354°·7 : 0″·5.

ν Persei (Espin). III^{h} 39^{m}·7, N. 42° 20′ : 4, 12 : 46°·6 : 31″·4.

β 1183. III^{h} 40^{m}·4, N. 45° 26′ : 6·3, 14·7 : 139°·9 : 6″·5.

Σ 443. III^{h} 41^{m}·5, N. 41° 15′ : 8·2, 8·8 : 44°·3 : 9″·1.

OΣ 63. III^{h} 42^{m}·5, N. 50° 29′ : 6·3, 11·5 : 270°·2 : 6″·9.

Σ 447. III^{h} 42^{m}·7, N. 38° 6′ : 7·8, 9 : 178°·3 : 26″·5 : y., o. β, '03 : 168°·3 : 28″.

Σ 446. III^{h} 43^{m}·4, N. 52° 25′ : 7, 9·2 : 252°·7 : 8″·5. Es., *comes* 12·5 : 38°·9 : 12″·2, and pair, 66″ away, at 336° : 10·5, 10·9 : 232°·5 : 2″·6. In cl.

ζ (Σ 464). III^{h} 49^{m}·1, N. 31° 39′ : 2·7, 9·3 : 207°·6 : 12″·5. grnsh. w., ash. 3 *comites* (β, 11·1, 9·3, 10 : 286°·6, 198°, 185°·1 : 32″·6, 89″·1, 119″·5), which seemed to me to increase their size with distance, '50 ; 9·3, however, might have been overpowered by 2·7. So Hunt, '61. H. appears to have found but 3 ; is one var. ? 11·1 quite obvious, 9⅓-in. ; Wa. and Sa., several others within 2′.

ε (Σ 471). III^{h} 52^{m}·5, N. 39° 47′ : 3·1, 8·3 : 9°·2 : 8″·8 : grn., blsh. w. W., bl., '50. 8·3 very small, '49, several times, once with Bishop's 7-in. achr. ; so my 5½-in., '63 and Sa., '74. De., 9·8, 7·5. Fr., not small, '77.

OΣ 69. III^{h} 54^{m}·7, N. 38° 36′ : 6·4, 9·1 : 327°·7 : 1″·6.

Σ 476. III^{h} 56^{m}·2, N. 38° 27′ : 7·5, 8·7 : 283°·8 : 17″·6 : y., bl. Fr., '15 : 287°·7 : 21″·6.

Σ 477. III^{h} 56^{m}·6, N. 41° 38′ : 8·3, 9·3 : 213°·4 : 3″.

OΣ 531. IV^{h} 2^{m}·2, N. 37° 52′ : 6·5, 8·2 : 147°·9 : 3″·3 : y., r., '55. Eddington, '11 : 127°·2 : 1″·7. 50, 12′ dist. has same p.m.

Wide pair. IV^{h} 2^{m}·7, N. 42° 59′ : 6·5, 6·5 : 285°·6 : 167″·7.

Ho. 327. IV^{h} 4^{m}·3, N. 31° 27′ : 6·3, 12 : 321°·7 : 16″·3.

Σ 500. IV^{h} 6^{m}·1, N. 40° 3′ : 8·5, 9·5 : 79° : 3″·9.

μ (OΣ 73). IV^{h} 9^{m}·0, N. 48° 12′ : 4·5, 12 : 349°·2 : 15″·1.

Σ 512. IV^{h} 10^{m}·0, N. 45° 12′ : 8·3, 8·3 : 225°·9 : 5″·2.

OΣΣ 44. IV^{h} 11^{m}·6, N. 46° 1′ : 6·2, 7·2 : 321°·8 : 58″·4.

OΣΣ 47. IV^{h} 14^{m}·2, N. 50° 4′ : De., 6·5, 7·2 : 327°·4 : 74″·6 : gold red, w. Es., '13 : 72″·6 ; *comes* to 6·5, 14 : 326°·3 : 26″·1 ; *comes* to 7·2, 10·5 : 257°·8 : 22″·8. 8′ *n*, a little *f*, is a fine pair, Σ 519 rej. Es., 7·5, 9 : 346°·7 : 18″ : or., bl.

OΣ 80. IV^{h} 17^{m}·6, N. 42° 14′ : 6·5, 7 : 188°·6 : 0″·5.

Σ 533. IV^{h} 19^{m}·2, N. 34° 8′ : 6, 7·5 : 60°·3 : 19″·6 : w. '31. De., pale r., pale bl., certain, '57. Fr., 7·5, blsh., '77. In a grand field with 55, 6 m^{s}.

56 (OΣ 81). IV^h 19^m·4, N. 33° 47′ : 6, 8·8 : 53° : 4″·5 : y., o. Bowyer, '11 : 37°·9.

Σ 552. IV^h 25^m·9, N. 39° 50′ : 6·3, 6·5 : 114°·4 : 9″.

57 (OΣΣ 50). IV^h 27^m·8, N. 42° 53′ : De., 5·2, 6·2 : 198°·9 : 113″·7 : y., w. Ysh., pale lilac, '52. Fr., 0·5 m^g. diff. ; ysh., blsh. β, '00 : 115″·2.

58. IV^h 31^m·5, N. 41° 6′ : 5·5 : or., has Σ 563 in field : 8, 9·7 : 29°·8 : 11″·7. Another pair, 10, 11, *sp*.

Σ 565. IV^h 32^m·5, N. 41° 58′ : 7·2, 8·5 : 180°·3 : 1″·6 : ysh., blsh. β, '00 : 173°·8.

STARS WITH REMARKABLE SPECTRA, AND VARIABLES.

φ. I^h 38^m·6, N. 50° 17′ : 4·2 : Hy. Pickering.

Star. I^h 40^m·0, N. 53° 34′ : 9·4 : IV. Fleming.

U (var.). I^h 54^m·2, N. 54° 26′ : 7·5–11 : 320^d. Fleming.

Nova 1. I^h 56^m·4, N. 56° 21′ : 9·2– ? : Fleming.

Es.-Birm. 39. I^h 57^m·8, N. 54° 51′ : 7·9 : R. h. III.

T (var.). II^h 13^m·6, N. 58° 35′ : 8·2–9·3 : Safarik.

S (var.). II^h 17^m·2, N. 58° 13′ : 7·8–11·2. Krueger. Turner notes the similarity between this star's var. and the var. of sun spots.

Es.-Birm. 53. II^h 32^m·6, N. 56° 42′ : 9·3 : R. : h. III.

Star. II^h 35^m·3, N. 56° 23′ : 9·1 : V. : Fleming.

W (var.). II^h 44^m·7, N. 56° 39′ : 7·5–11 : Es.

Es.-Birm. 58. II^h 45^m·1, N. 57° 31′ : 8·9 : R. : Hn. IV.

Star. II^h 46^m·2, N. 56° 36′ : 9·5 : V : Fleming.

ρ (var.). III^h 0^m·0, N. 38° 32′ : 3·4–4·2 : Schm. III.

Es.-Birm. 64. III^h 5^m·2, N. 57° 36′ : 7·9 : IV : Pickering.

Es.-Birm. 66. III^h 8^m·1, N. 47° 32′ : 9 : IV : Es.

Es.-Birm. 72. III^h 24^m·1, N. 55° 6′ : 7·5 : R. : W.

R (var.). III^h 24^m·9, N. 35° 24′ : 8–13·5 : 210^d·1 : Schönfeld.

Nova 2. III^h 25^m·7, N. 43° 31′. Anderson, '01. Found before max., it became the brightest star in the N. sky.

Early photos showed dark lines, these became flanked with bright lines, and later the spect. became nebular. Wolf and Ritchey found it encompassed with nebulous matter which expanded with enormous velocity. D'Esterre, 1913, found Nova irregularly var. from 11·7 to 13·2. So Steavenson, 1916.

ψ. III^h 30^m·8, N. 47° 55′ : 4·3 : Hy. : Pickering.
Es.-Birm. 77. III^h 40^m·0, N. 53° 40′ : 8 : R. : h. III.
X (var.). III^h 50^m·3, N. 30° 49′ : 6·5 : Hy. : Fleming.
c. IV^h 2^m·8, N. 47° 30′ : 4 : Hy. : Frost.
Es.-Birm. 82. IV^h 7^m·9, N. 32° 20′ : 6·5 : R. : B. III.
Es.-Birm. 82*a*. IV^h 8^m·8, N. 49° 17′ : 8·8 : R. : Es.
Es.-Birm. 96. IV^h 40^m·1, N. 32° 47′ : 8·7 : R. : h. III.

NEBULA AND CLUSTERS.

650, 651 (M. 76 and H. I 193). I^h 37^m·2, N. 51° 10′. Pearly w. neb., double, curious miniature of M. 27, and like it gaseous, *p* a little the brighter. E. of Rosse, spiral. Lick photo, the two joined and traces of ring.

869, 884 (H. VI 33, 34). II^h 15^m·1, N. 56° 47′. These two gorgeous clusters, described by Sm. as 'affording together one of the most brilliant telescopic objects in the heavens,' are visible to the naked eye as a protuberant part of the Galaxy, and so H. considers them. They are often called *The sword-hand of Perseus*. With 64 these superb masses were visible together, as well as a bright part *n*. 5½-in. showed a red star between them. Sm. mentions a ruby and a garnet in 884. 9⅓-in. shows 5 stars in all. T. T. Smith sees 8. Es. sees 9 in the cl. and outliers, all very similar in col., and spectrum (faint III type). The red stars are all associated with 884. Adams finds that the brighter stars in the cl. have nearly the same radial velocity.

Follow the curve of stars *n*, which leads into a glorious region at 11^{h} 6^{m}, N. 58° 55′.

Beautiful field, 11^{h} 14^{m}, 54°.

957 (h. 227). 11^{h} 27^{m}·8, N. 57° 10′. Wide cl., h. 13–15 m^{g}., a little *f* 869.

Group. 11^{h} 31^{m}·0, N. 55° 37′, with reddish star. Es.

1039 (M. 34). 11^{h} 36^{m}·9, N. 42° 26′. Just perceptible to naked eye; very grand low-power field, one of the finest objects of its class. It contains OΣ 44, which see.

1245 (H. VI 25). 111^{h} 9^{m}·2, N. 46° 56′. A low power shows a very faint large cloud of minute stars (h. 12–15 m^{g}.), beautifully bordered by a brighter foreshortened pentagon.

1528 (H. VII 61). IV^{h} 9^{m}·1, N. 51° 2′. Bright cl., good low-power object; larger stars in curves. E. of Rosse, 9½ m^{g}., red, 30′ *sf*, another 2′ *f*.

IV^{h} 30^{m}·9, N. 50° 53′. Centre of dark space, extending 5^{m}. in R.A. and 1° in Dec., which Es. believes to be occupied by a body absorbing the light of the stars. Barnard has found several objects which he believes to be due to an absorption medium, one at 18^{h} 7^{m}, S. 18° 15′ especially remarkable.

PISCES.

A dull region, containing some good telescopic objects.

Double Stars.

34 (Σ 5). 0^{h} 5^{m}·9, N. 10° 42′ : 6, 10·5 : 162°·8 : 8″.

35 (Σ 12). 0^{h} 10^{m}·8, N. 8° 22′ : 6·2, 7·8 : 149°·9 : 11″·5 : w. W., bluish, '48. M^{gs}. var. ?. De., 5·8, 7·2.

38 (Σ 22). 0^{h} 13^{m}·3, N. 8° 25′ : 7, 8 : 236°·7 : 4″·7. A. divides 7 : 7·6, 7·7 : 300°·1 : 0″·1.

Σ 20. 0^{h} 13^{m}·3, N. 16° 4′ : 8, 9 : 230°·1 : 12″·2.

Σ 25. 0^{h} 14^{m}·6, N. 15° 33′ : 8·5, 8·5 : 192°·7 : 1″·7.

42 (Σ 27). 0^{h} 18^{m}·4, N. 13° 2′ : 6·8, 10·7 : 344° : 31″·7 : v.y., o. 10·7 too small for col., 9-in. spec. '71. h., 7, 9 : or., bl., '27. Sa., bright grn., '74. De., 6·6, 11. β, '04 : 332°·8 : 28″·8.

51 (Σ 36). 0^{h} 28^{m}·3, N. 6° 31′ : 5, 9 : 82°·3 : 27″·4 : w., ash. W,, blsh., '50.

52 (h. 1982). 0^{h} 28^{m}·4, N. 19° 51′ : β, 5·8, 11·4 : 305°·7 : 38″·3. '00 : 41″·2. p.m. 11·4 easy 9-in. spec., '71.

55 (Σ 46). 0^{h} 35^{m}·7, N. 21° 0′ : 5, 8·2 : 192°·7 : 6″·4 : v.y., v. bl. 8·2, very small, col. indistinct, '48, '50 ; 10 m^{g}. 9-in. spec., '71. Fr., like 10, '76 ; yet De., 8·2.

65 (Σ 61). 0^{h} 45^{m}·6, N. 27° 16′ : 6, 6 : 299° : 4″·4 : ysh.

β 496. 0^{h} 47^{m}·4, N. 12° 21′ : 6·5, 12·5 : 2° : 5″·1.

66 (OΣ 20). 0^{h} 50^{m}·3, N. 18° 45′ : 5·9, 7 : 60°·4 : 0″·8 : ysh., blsh., '61. A., '11 : 308°·2 : 0″·5. Bin.

Σ 74. 0^{h} 50^{m}·6, N. 9° 0′ : 8, 9 : 301°·9 : 3″.

Σ 80. 0^{h} 55^{m}·3, N. 0° 21′ : 7, 8·2 : 300°·1 : 18″·3 : y., bl. R., fine bl., '50. Fr., '14 : 323°·3 : 22″·4. orange, bl. p.m.

Σ 82. 0^{h} 56^{m}·5, N. 9° 3′ : 8·3, 9·3 : 303°·8 : 1″·7. Doo., *comes* at 34° : 75″, double : 10, 11 : 105°·7 : 10″·9.

Σ 87. 1^{h} 1^{m}·2, N. 14° 58′ : 8·5, 8·5 : 193° : 6·6 : ysh.

ψ^{1} (Σ 88). 1^{h} 1^{m}·4, N. 21° 3′ : 4·9, 5 : 160°·3 : 29″·9. h., 11 m^{g}. *f.* Fr., 2-in., '77.

77 (Σ 90). 1^{h} 1^{m}·7, N. 4° 29′ : 5·9, 6·8 : 82°·7 : 32″·8 : w. W., blsh., '50. Fr., yw., ruddy, '14.

Σ 98. 1^{h} 8^{m}·4, N. 31° 39′ : 7, 8 : 247°·9 : 19″·3.

OΣ 26. 1^{h} 8^{m}·6, N. 29° 39′ : 6·2, 10 : 257°·2 : 10″·8 : y., o.

φ (Σ 99). 1^{h} 9^{m}·4, N. 24° 10′ : 4·7, 10·1 : 227°·5 : 8″ : v.y., bl. 10·1 missed, '50, '51. P., *duplex ; comes* var. ?

ζ (Σ 100). 1^{h} 9^{m}·5, N. 7° 9′ : 4·2, 5·3 : 63°·7 : 23″·5 : w. W., greyish, '50. Ysh., pale lilac, or rose, '53. Du., both pale y., '69. 4·2 var. ? 4·2–6. β, *comes* to 5·3, 11 : 248°·7 : 0″·9. β, '98 : 241°·7. c.p.m.

ρ. 1^{h} 21^{m}·9, N. 18° 46′, and 94, both 5 m^{g}., form a splendid pair.

Σ 122. 1^{h} 22^{m}·7, N. 3° 8′ : 7·9, 9 : (328°·4) : 5″·8 : v.w., bl.

OΣΣ 19. 1^{h} 24^{m}·2, N. 7° 33′ : De., 7·3, 7·8 : β, 98°·8 : 69″·3. Rosy, and blsh., '50. Fr., '13 : 99°·9 : 68″·4.

Σ 129. 1^{h} 26^{m}·0, N. 12° 15′ : 8·5, 9 : 283°·2 : 8″·4.

η (β 506). 1^{h} 27^{m}·2, N. 14° 56′ : 4, 11 : 12°·9 : 1″.

100 (Σ 136). 1^{h} 30^{m}·6, N. 12° 9′ : 6·9, 8 : 78°·8 : 16″ : w. W., bl., '50. Fletcher, y., lilac, '52. Fr., ruddy, '76.

Σ 138. 1^{h} 31^{m}·9, N. 7° 16′ : 7·3, 7·3 : 20° : 1″·5 : y.w. Acocks, '14, 42°·1. Fine test, requiring beautiful weather; elong. 80; in contact, 144; divided, 250. Ho., *comes*, 14; 62°·8 : 22″·2. β, '03 : 65°·1 : 23″·5. Look in finder for long narrow trapezium, between μ and *o* ; it is the *p* of the two *s* stars. In the telescope a 10 m^{g}. lies near it *nf*, fainter *comes sp*.

103 (β 5). 1^{h} 34^{m}·9, N. 16° 13′ : 7, 9 : 297°·3 : 1″·3.

Σ 142. 1^{h} 35^{m}·6, N. 14° 51′ : 8·2, 8·4 : 311°·6 : 26″·1.

Σ 146. 1^{h} 37^{m}·1, N. 9° 42′ : 8·3, 8·3 : 306°·5 : 23″·8.

Σ 155. 1^{h} 40^{m}·0, N. 9° 5′ : 7·5, 7·9 : 332°·8 : 4″·6. D., vars. β 509, 29^{s} *p*, 6′ *n* : 8·5, 9 : 98°·7 : 0″·9. Furner, '11 : 246°·3.

Σ 186. 1^{h} 51^{m}·7, N. 1° 27′ : 7·2, 7·2 : 64°·7 : 1″·2. Bowyer, '12 : 218°·3 : 0″·9. Bin., now widening. Ph., '15 : 39°·5 : 1″·0.

α (Σ 202). 1^h 57^m·9, N. 2° 23′ : 2·8, 3·9 : 335°·7 : 3″·6 : grnsh. w., bl., '32. Ph., '14 : 315°·0 : 2″·5. I found contrast certain, but 3·9 troublesome as to col., usually ruddy, or tawny, sometimes bl. Pale y., brown y., 'quite satisfactory' : $3\frac{7}{10}$-in., '55. Pale y., tawny or fawn col., 'certain,' $5\frac{1}{2}$-in., '60. 3·9 blsh. ? 'No strong contrast,' '62. Brownish, at first fancied blsh., 9-in., '71.

2 (Barnard). XXII^h 56^m·3, N. 0° 32′ : β, 6, 13·4 : 92°·6 : 3″·3.

Σ 3009. XXIII^h 20^m·2, N. 3° 16′ : 6·8, 8·8 : 229°·5 : 6″·9 : v.y., bl.

κ^1, κ^2. XXIII^h 22^m·8, N. 0° 49′ : 5, 6 : fine field containing 2 minute rubies (not seen, $17\frac{1}{4}$-in., Es). W. C. Bruce.

Σ 3019. XXIII^h 26^m·6, N. 4° 48′ : 7·1, 8·1 : 185°·3 : 10″·7.

Σ 3030. XXIII^h 36^m·6, S. 0° 50′ : 8·4, 8·6 : 220°·8 : 8″·5.

Σ 3031. XXIII^h 37^m·1, N. 5° 49′ : 7·5, 8·5 : 312°·9 : 14″·6.

Σ 3033. XXIII^h 39^m·8, N. 6° 48′ : 8·5, 8·5 : 9°·9 : 3″·3.

27 (β 730). XXIII^h 54^m·6, S. 4° 0′ : $5\frac{1}{2}$, 10 : 265°·8 : 1″·4.

Σ 3054. XXIII^h 59^m·0, N. 7° 49′ : 7·5, 8·5 : 181°·5 : 33″·7.

STARS WITH REMARKABLE SPECTRA, AND VARIABLES.

Es.-Birm. 5. 0^h 16^m·5, N. 2° 35′ : ? : R. : var. ? Pickering.

47. 0^h 23^m·9, N. 17° 27′ : 5·4 : OR. : III : D'A.

T (var.). 0^h 27^m·9, N. 14° 9′ : 9·5–11 : Irreg. Luther.

57. 0^h 42^m·4, N. 15° 2′ : 5 : III : D'A.

Es.-Birm. 19. 1^h 11^m·7, N. 25° 14′ : 7 : IV : D'A. Var. Wendell.

S (var.). 1^h 13^m·4, N. 8° 31′ : 8·2–14·7 : 404^d·3 : Hind.

U (var.). 1^h 18^m·7, N. 12° 27′ : 9·4–15 : 172^d·7 : Peters.

R (var.). 1^h 26^m·5, N. 2° 28′ : 7·6–13·5 : 344^d·1 : Hind.

β. XXII^h 59^m·8, N. 3° 23′ : 4·6 : Hy. : Frost.

19 (Es.-Birm. 756). XXIII^h 42^m·3, N. 3° 2′ : 6·2 : R. : IV type. Se. Magnificent object. Var., according

to Gould, but Chandler believes the apparent var. is due to the red col. Es., however, saw a well-marked max. 5·2 m^g., 1884, Aug. 19, and places it as leader of a class of variables whose characteristics are spectrum IV type. Var. about 1 m^g. Per. irregular. These stars for long intervals are nearly constant in light, and then for a short time rise to a max. Probably all the stars of type IV are subject to these fluctuations. In estimating magnitude of red stars it is well to put them out of focus, and thus compare *discs* of light instead of *points*. A binocular is a capital instrument for comparing together the magnitudes of the brighter stars. Webb notes a curious 8 m^g. triangle 11 min. *f*, 30′ *s*.

30. xxiii^h 57^m·8, S. 6° 28′ : 5 : YR. : III. Du.

NEBULA.

524 (H. I 151). i^h 20^m·6, N. 9° 7′. Round, brighter centre ; 4 stars near.

PISCIS AUSTRALIS.

A constellation of which the first magnitude, *lucida*, Fomalhaut (xxii^h 53^m·2, S. 30° 3′) appears as a glittering object, low down in the south, below Aquarius.

DOUBLE STARS (N. of 31°).

η (β 276). xxi^h 56^m·2, S. 28° 51′ : 5, 6 : 113°·3 : 1″·2.

h. 5356. xxii^h 35^m·3, S. 28° 45′ : 6, 7 : 159°·7 : 85″·3. *Comes* to 7, 9 : 57°·6 : 4″·4, '37. Scott, '03 : 63° : 3″·1.

Variable Star.

R (var.). XXII^{h} 13^{m}·5, S. 30° 0′ : 8·5<11 : 292^{d} : Gould.

SAGITTA.

A little asterism, of much greater antiquity than might have been supposed from its size, and the smallness of its components. Sweeping here magnificent; few coloured stars.

Double Stars.

Σ 2484. XIX^{h} 10^{m}·7, N. 18° 56′ : 7·4, 8·9 : 218°·4 : 2″·5 : yw., o. Do., ’02 : 229°.

2, 3 (Σ I 41). XIX^{h} 20^{m}·8, N. 16° 46′ : 5·9, 6·7 : v.w., form a wide pair.

ε (OΣΣ 185). XIX^{h} 35^{m}·7, N. 16° 17′ : 5·7, 7·7 : 81°·2 : 91″·4. β, ’01 : 89″·8. Pale y., fine bl., ’50.

H*h*. 630. XIX^{h} 35^{m}·8, N. 16° 23′ : β, 6·5, 8·6 : 301°·3 : 28″·5. H., red, bl. β, pair 41′ *n*. 8·1, 11·7 : 333°·3 : 12″·4. 5^{m} 22^{s} *f*, 15′ *n*, is Σ 2569 : 8, 8·5 : 2°·3 : 2″·4.

ζ (Σ 2585). XIX^{h} 45^{m}·4, N. 18° 57′ : 5·7, 8·8 : 312°·8 : 8″·5 : grnsh. w., bl. A.G.C. divided 5·7; β, 6, 6 : 157°·6 : 0″·3. ’78. A., ’12 : 29°·4 : 0″·1. All c.p.m. 8·8 has been thought var. in col. P. Sm., *comes* : 15 : 251° : 71″.

β 149. XIX^{h} 54^{m}·6, N. 16° 16′ : 6·5, has double *comes f* : 9·9, 12·5 : 199°·8 : 8″·3.

χ (H*h*. 655). XIX^{h} 56^{m}·4, N. 17° 17′ : β, 6, 12 : 207°·4 : 28″·8 : or. is *lucida* of a beautiful group containing smaller red star, and pretty 10 m^{s}. pair. 6, fine III.

15. xx$^{\rm h}$ 0$^{\rm m}$·5, N. 16° 51′ : 6 m$^{\rm g}$. ; commands another fine group. *n*, a little *p*, at a few minutes' dist. a 7 m$^{\rm g}$. beautiful sapph. bl.

Σ 2622. xx$^{\rm h}$ 0$^{\rm m}$·5, N. 16° 47′ : 8, 8·7 : 194°·2 : 6″.

η. xx$^{\rm h}$ 1$^{\rm m}$·6, N. 19° 46′ : 5½ m$^{\rm g}$., y., lies in a rich region. A circle round it of 30′ or 40′ radius will include several very pretty 8 or 9 m$^{\rm g}$. pairs, on different sides.

θ (*Σ* 2637). xx$^{\rm h}$ 6$^{\rm m}$·4, N. 20° 43′ : 6, 8·3, 7·1 : 326°·7, 226°·6 : 11″·4, 70″·7 : yw., ash., y. W., blsh., reddish, '47. *β*, '03 : 78″·3 for 7·1.

Stars with Remarkable Spectra, and Variables.

U (var.). xix$^{\rm h}$ 15$^{\rm m}$·3, N. 19° 28′ : 6·5–9 : 3$^{\rm d}$·4 : Algol type. Schwab.

T (var.). xix$^{\rm h}$ 18$^{\rm m}$·1, N. 17° 30′ : 8·3–9·9 : Irr. : Es.

δ. xix$^{\rm h}$ 43$^{\rm m}$·8, N. 18° 20′ : 4 : III : Vogel.

S (10) var. xix$^{\rm h}$ 52$^{\rm m}$·4, N. 16° 25′ : 5·5–6·1 : 8$^{\rm d}$·4 : Gore.

Es.-Birm. 639*a*. xix$^{\rm h}$ 59$^{\rm m}$·3, N. 20° 50′ : 9·4 : IV : Es.

Es.-Birm. 643. xx$^{\rm h}$ 1$^{\rm m}$·6, N. 20° 26′ : 8·9 : R. : Pechüle. IV : Var. ? Es.

R (var.). xx$^{\rm h}$ 10$^{\rm m}$·4, N. 16° 29′ : 8·5–10·4 : 70$^{\rm d}$·5, with double max., like *β* Lyræ. Baxendell.

Cluster.

6838 (M. 71). xix$^{\rm h}$ 50$^{\rm m}$·2, N. 18° 34′ : large and dim, hazy to low powers with $3\frac{7}{10}$-in., yielding a cloud of faint stars (h. 11–16 m$^{\rm g}$.) to higher magnifiers. Rather more than 1° *sp* *γ*. About 1° *sp* is a beautiful low-power field, containing pair, and triple group, all about 8 or 9 m$^{\rm g}$.

SAGITTARIUS.

The stars of this constellation have a beautiful effect above the S. horizon near the place where the Galaxy passes from sight in our latitude ; but they are apt to be obscured by haze. The Milky Way is here very rich in a transparent night, but we see only the N. edge of a splendid portion of it.

DOUBLE STARS.

h. 5003. xvii^{h} 52^{m}·9, S. 30° 15′ : 6, 7 : 105°·1 : 4″·8.

β 283. xvii^{h} 57^{m}·1, S. 22° 47′ : 6·5, 12·5 : 239°·3 : 8″. *Comes*, 14 : 34°·4 : 14″·1.

β 245. xviii^{h} 3^{m}·9, S. 30° 45′ : 6, 10 : Doo., 353°·8 : 4″.

μ^{1} (h. 2822). xviii^{h} 9^{m}·0, S. 21° 5′ : β, 3½, 11, 9·5, 9·5 : 257°·7, 312°·1, 115°·4 : 16″·7, 48″·3, 50″·1. β sees *comites* 13 : 118°·7 : 25″·2, and 14 : 34°·4 : 14″·1. Spect. Bin.

21 (A.C. 10). xviii^{h} 20^{m}·6, S. 20° 35′ : D., 5, 8¼ : 292°·7 : 2″·5 : '53. A., '00 : 1″·8.

About 1¼° *s* of λ, xviii^{h} 23^{m}·0, S. 25° 28′, is a fine 7 m^{g}. triangle with *comites* to the *s* and *f* stars.

See. 355. xviii^{h} 30^{m}·7, S. 19° 20′ : 6, 13·9 : 238°·9 : 12″·9.

28 (See. 360). xviii^{h} 41^{m}·5, S. 22° 28′ : 5·6, 14·7 : 209°·1 : 12″·5.

29 (See. 362). xviii^{h} 44^{m}·9, S. 20° 25′ : 5·8, 14·5 : 0°·2 : 17″.

ν^{2} (β 1033). xviii^{h} 49^{m}·4, S. 22° 50′ : 5·5, 11 : 106°·4 : 2″·3 ; *comes*, 10·5 : 59°·6 : 28″·2.

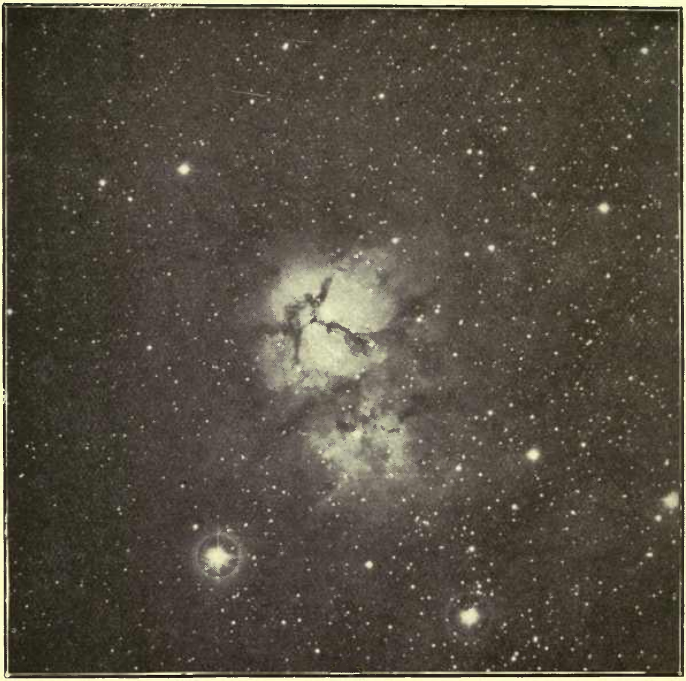
ζ (Har. 150). xviii^{h} 56^{m}·6, S. 30° 0′ : 4, 5 : 251°·1 : 0″·8. Bin. Per. 20·9 years, Barnes. Innes, '12 : 247°·8 : 0″·7, who deems Do.'s period, 21·6 years, to be best.

h. 5082. xviii^{h} 58^{m}·4, S. 19° 13′ : 6, 9·5 : 10·7 : See, 89°·2, 112°·2 : 7″·3, 20″·7.

S. 710. xix^{h} 2^{m}·3, S. 16° 21′ : 6, 10 : 4°·6 : 7″.
h. 2866. xix^{h} 18^{m}·8, S. 18° 10′ : 8, 8·3, 8·6 : 53°, 137°·1 : 23″·4, 23″·9. *Comes*, 12, to 8·6.
H*h*. 619. xix^{h} 24^{m}·9, S. 27° 10′ : *β*, 6, 8·2 : 141°·6 : 7″·8.
Σ 2565. xix^{h} 40^{m}·8, S. 13° 25′ : 8·8, 8·8 : 34°·1 : 5″·4.
I 1039. xix^{h} 44^{m}·2, S. 28° 59′ : 6·1, 10·5 : 290° : ±2″·5.
h. 2904. xix^{h} 49^{m}·5, S. 24° 8′ : *β*, 6·6, 10·2 : 137°·6 : 17″·5. *β*, '05 : 101°·4 : 15″·1. p.m. of 0″·5.
See. 401. xix^{h} 56^{m}·6, S. 22° 52′ : 5·2, 14·5 : 220°·7 : 13″.

Stars with Remarkable Spectra, and Variables.

X (var.). xvii^{h} 42^{m}·5, S. 27° 48′ : 4·4–5 : 7^{d}·0 : Schom.
Nova 2. xvii^{h} 55^{m}·1, S. 27° 33′ : 7·5–? : Fleming, '10.
Star. xvii^{h} 59^{m}·0, S. 24° 22′ : 6·1 : Hy : Har.
W (var.). xviii^{h} 1^{m}·6, S. 29° 35′ : 4·3–5·1 : 7^{d}·5 : Schm.
Nova 4. xviii^{h} 1^{m}·8, S. 27° 26′ : 10·4–? Cannon, '01.
Star. xviii^{h} 3^{m}·3, S. 19° 25′ : 9·6 : V : Fleming.
Star. xviii^{h} 3^{m}·7, S. 21° 16′ : 7·8 : V : Pickering.
Es.-Birm. 513. xviii^{h} 5^{m}·1, S. 15° 18′ : 8·3 : R. : D'A.
Es.-Birm. 518. xviii^{h} 8^{m}·3, S. 18° 58′ : 9 : OR. : Hn.
Es.-Birm. 519. xviii^{h} 8^{m}·9, S. 19° 16′ : 8·7 : R. : Hn.
Es.-Birm. 520. xviii^{h} 9^{m}·1, S. 19° 7′ : 8·8 : R. : Hn.
Es.-Birm. 523. xviii^{h} 10^{m}·7, S. 18° 57′ : 8·7 : OR. : Hn.
Es.-Birm. 524. xviii^{h} 10^{m}·9, S. 19° 59′ : 9·1 : R. : Hn.
Es.-Birm. 526. xviii^{h} 13^{m}·7, S. 18° 17′ : 8 : R. : Hn.
Nova 3. xviii^{h} 15^{m}·0, S. 25° 14′ : 8·5–? : Cannon, '99.
Es.-Birm. 530. xviii^{h} 16^{m}·6, S. 24° 57′ : 6·5 : R. : Hn.
Y (var.). xviii^{h} 16^{m}·7, S. 18° 54′ : 5·4–6·2 : 5^{d}·7 : Sawyer.
Es.-Birm. 535. xviii^{h} 23^{m}·4, S. 21° 17′ : 8·7 : R. : Hn.
Star. xviii^{h} 24^{m}·5, S. 25° 18′ : 6·2 : Hy. : Fleming.
Es.-Birm. 537. xviii^{h} 26^{m}·7, S. 21° 18′ : 8·5 : R. : Hn.
Es.-Birm. 539. xviii^{h} 26^{m}·8, S. 17° 28′ : 10 : R. : Hn.



THE TRIFID NEBULA, M. 20, SAGITTARII.

Photographed at the Lick Observatory.

U (var.). XVIII^{h} 27^{m}·2, S. 19° 11′ : 6·5–7·3 : 6^{d}·7 : Schm.
Es.-Birm. 557. XVIII^{h} 38^{m}·2, S. 19° 22′ : 6·5 : R. : Hn.
ST (var.). XVIII^{h} 57^{m}·0, S. 12° 52′ : 8<12·5 : 403^{d} : Fleming.
Nova 1. XVIII^{h} 57^{m}·3, S. 13° 16′ : 4·7–? : Fleming, '98.
SU (var.). XVIII^{h} 58^{m}·8, S. 22° 50′ : 8–9 : Fleming.
T (var.). XIX^{h} 11^{m}·6, S. 17° 7′ : 7·2–12 : 381^{d}·3 : Pogson.
R (var.). XIX^{h} 12^{m}·0, S. 19° 27′ : 6·9–12·3 : 269^{d} : Pogson.
Es.-Birm. 595. XIX^{h} 14^{m}·6, S. 16° 4′ : 6·8 : R. : Hn. IV.
S (var.). XIX^{h} 14^{m}·8, S. 19° 10′ : 9·1–14·5 : 230^{d}·7. Pogson.
υ. XIX^{h} 17^{m}·1, S. 16° 7′ : 4·7 : Hy. : Fleming.
Es.-Birm. 611. XIX^{h} 29^{m}·4, S. 16° 33′ : 7·2 : R. : h. IV : Se. Var. Wells.
RR (var.). XIX^{h} 51^{m}·0, S. 29° 24′ : 7·5–12·6 : 335^{d} : Fleming.
Es.-Birm. 642. XX^{h} 2^{m}·0, S. 27° 27′ : 8 : R. : h. var. Fleming.

Clusters and Nebulæ.

6514 (M. 20). XVII^{h} 57^{m}·5, S. 23° 2′. The Trifid neb. closely *f* a cruciform group. Very curious object; pair with minute *comes* 'where three ways meet, dark rifts through nebulosity.' β, with 36-in., sees six stars with positions as follows:—

A B : 8, 10·6 : 22°·5 : 6″·1. A C : 212°·3 : 10″·7. C= 8·8. C D : 281°·7 : 2″·2. D=10·5. C E : 190°·8 : 6″·2. E=12·4. A F : 106°·4 : 22″·1. F=13·8. C G : 211°·9 : 29″·6. Spect. not gaseous; yet La. and Holden report conspicuous change. Neb. imperfectly seen by Sm. as well as myself; rather low. Grand region.

6523 (M. 8). XVII^{h} 58^{m}·8, S. 24° 23′. Splendid Galaxy object; visible to naked eye. In a large field we find a bright, coarse triple star, followed by a resolvable luminous mass, including two stars, or starry centres, and then by a loose bright cl. enclosed by several stars: a very fine combination. h., a set of milky streaks and loops. Se. suspects change, and finds the spectrum gaseous.[1]

6531 (M. 21). xvii^{h} 59^{m}·9, S. 22° 30′. In a lucid region.

6568 (H. VII 30). xviii^{h} 7^{m}·9, S. 21° 37′. Curious large undefined cloud of 10 m^{g}. (h., 11–13 m^{g}.) stars; requiring low power and steady gazing; $\frac{1}{2}$° *s* of μ^1.

6626 (M. 28). xviii^{h} 19^{m}·6, S. 24° 55′. Not bright. h., 14–16 m^{g}. 1° *np* λ.

M. 25. xviii^{h} 27^{m}·2, S. 19° 11′. Coarse and brilliant. Not in G.C.

6656 (M. 22). xviii^{h} 31^{m}·5, S. 24° 3′. Beautiful bright cl., very interesting from visibility of components, largest 10 and 11 m^{g}., which makes it a valuable object for common telescopes, and a clue to the structure of many more distant or difficult neb. h. makes all the stars of two sizes, 11 and

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[1] At xvii^{h} 57^{m}, S. 18° 50′ a little *np* μ, is a spot referred to by Se. as exemplifying in a high degree the marvellous structure which his achromatic at Rome shows in the Galaxy. The remarks of this accomplished astronomer on the successive layers of stars are very curious: first he finds large stars and lucid clusters; then a layer of smaller stars, certainly below 12 m^{g}.; then a nebulous stratum with occasional openings. But what, he says, startled him, and all to whom he showed it, was the regular disposition of the larger stars in figures 'si géométriques qu'il est impossible de les croire accidentelles. La plus grande partie sont comme des arcs de spirale; on peut compter jusqu'à 10 ou 12 étoiles de la 9me à la 10me grandeur . . . se suivant sur une même courbe comme les grains de chapelet; quelquefois elles forment des rayons qui semblent diverger d'un centre commun, et ce qui est bien singulier on voit d'ordinaire que, soit au centre des rayons, soit au commencement de la branche de la courbe, on trouve une étoile plus grande et rouge. Il est impossible de croire que telle distribution soit accidentelle.' He mentions, besides this spot, several instances in Cygnus. Compare the spiral discovered by the E. of Rosse in many nebulæ; and see also Sm.'s remark on M. 35.

15 m^{g}., as if 'one shell over another,' and thinks the larger ones ruddy. Midway between μ and σ.

6818 (H. IV 51). xix^{h} 40^{m}·5, S. 14° 21′. Plan., bl., like star out of focus. E. of Rosse, and D'A. darker centre; h. otherwise. Huggins, spect. gas. 2° *n*, a little *f* 54.

6864 (M. 75). xx^{h} 1^{m}·4, S. 22° 9′. Bright nucleus with low power. h., resolvable.

SCORPIO.

A fine constellation, little noticed by casual star-gazers from its low altitude and short continuance above the horizon, with the additional disadvantage of its culminating during the brief summer's night. The student will do well to look out for it, and it will repay an hour or two of extra watching.

DOUBLE STARS.

2 (β 36). xv^{h} 48^{m}·8, S. 25° 5′ : 6, 8 : 279° : 3″.

ξ (Σ 1998). xvi^{h} 0^{m}·0, S. 11° 10′ : 4·9, 5·2 : 356° : 1″·1 : yw. : '25. Bin. Per., Lewis, 97·8 years, A., 44·7 years. A., '12 : 157°·7 : 0″·7, now widening. Third star, 7·2 : 78°·6 : 6″·7 : '25. Jouffray, '03 : 63°·2 : 7″·3. Probably a system like ζ Cancri. Elong. ? '51. Beautiful field., *s* a little *f* is Σ 1999 : 7·8, 8·1 : 102°·2 : 10″·5 : w. (some obs. bl., or purp.), yw. Fr., '15, 99°·4 : 11″·3. Sa., 11 m^{g}. *f*.

β (H*h*. 494). xvi^{h} 0^{m}·8, S. 19° 36′ : Σ, 2, 4 : 24°·4 : 13″·1. Pale y., grnsh. ? '50. β doubled 2 : 10 : 93°·9 : 0″·9.

11 (β 39). xvi^{h} 3^{m}·2, S. 12° 32′ : De., 6·1, 10·4 : 256°·5 : 3″·3.

ν (H*h*. 497). xvi^{h} 7^{m}·3, S. 19° 15′ : De., 4·1, 7 : 336°·8 : 40″·8. Mitchel and Jacob divided 7. De., 7, 8 : 47°·9 :

1″·9 : ’75. I have seen it easily with 5½-in., Grover has even just separated it with 2-in. β, De., and others double 4; De., 4·1, 6·6 : 360° : 0″·7. All apparently fixed.

12 (h. 4839). XVI^h 7^m·3, S. 28° 12′ : See, 6, 8·7 : 77°·5 : 4″·1.

H*h*. 504. XVI^h 15^m·8, S. 19° 56′ : Wilson, 8·5, 9·5 : 22°·5 : 12″·7. Another pair in field *p*, (H*h*. 503), a beautiful group.

σ (H*h*. 505). XVI^h 16^m·3, S. 25° 24′ : 3, 8 : 271°·2 : 20″·4. Spect. Bin.

h. 4850. XVI^h 19^m·6, S. 29° 31′ : 6·5, 7 : 352°·1 : 6″·9.

α (Antares). XVI^h 24^m·5, S. 26° 16′. This great star, Sm. justly terms fiery red ; and it is a grand telescopic object. Its tint, however, is not uniform ; to me the disc appears y., with flashes of deep crimson alternating with a less proportion of fine green, the latter mixture perhaps accounted for by the 7 m^g. (first seen by Burg, 1819) star near enough to be usually involved in the flaming rays of the principal, forming an atmospheric, rather than optical test. De., 275°·7 : 3″·7 : ’64. Fixed. D. noticed a curious proof of its independent, not contrasted grn. light, when it emerged, in ’56, from behind the dark limb of the moon. Large star, III type, fine spectrum.

STARS WITH REMARKABLE SPECTRA, AND VARIABLES.

Es.-Birm. 430. XV^h 18^m·0, S. 28° 18′ : 8·5 : R. : Holden.
RZ (var.). XV^h 59^m·8, S. 23° 53′ : $8 < 13$: 158^d : Innes.
X (var.). XVI^h 3^m·8, S. 21° 19′ : $10 < 13$: 199^d : Peters.
W (var.). XVI^h 7^m·1, S. 19° 56′ : $10 < 14·7$: 221^d·5 : Palisa.
T (nova). XVI^h 12^m·3, S. 22° 47′ : $7 < 12$: Auwers.

R (var.). XVI^h 12^m·9, S. 22° 45′: 9·5–16: 224^d·1: Chacornac.

S (var.). XVI^h 12^m·9, S. 22° 42′: 9·1–15: 176^d·7: Chacornac.

U (var.). XVI^h 17^m·9, S. 17° 41′: 9<12: Nova ?: Pogson.

RR (var.). XVI^h 51^m·5, S. 30° 27′: 7–12·1: 281^d: Fleming.

CLUSTERS.

6093 (M. 80). XVI^h 12^m·3, S. 22° 47′. Like a comet; in a beautiful field, halfway between α and β. H. calls it the richest and most condensed mass of stars in the firmament, and speaks of it as on the W. edge of a vast starless opening 4° broad; in which, however, I found many minute stars. h., cl. 14 m^g. Beautiful field. Nearly central, is the strange var., T, which, 1860, between May 18 and 21, had blazed out to 7 m^g., extinguishing apparently the cl., had almost faded by June 16, and has never distinctly reappeared. In field, *f* a little *n*, are the two vars. R and S; the whole in singular juxtaposition.

6121 (M. 4). XVI^h 18^m·7, S. 26° 20′. Large, rather dim, resolvable, followed by a vacant starless space. h. has remarked many vacancies of this kind. See Appendix I.

6266 (M. 62). XVI^h 56^m·1, S. 30° 3′. h., fine cl., but very low.

SCULPTOR.

A constellation very low in our latitudes, and containing no bright stars; it is situated below β Ceti.

DOUBLE STARS.

See 2. 0^h 3^m·7, S. 22° 57′: 5·7, 12·3: 174°·3: 2″·1.

κ^1 (β 391). 0^h 5^m·3, S. 28° 3′: 6, 6·2: 97°·2: 0″·8.

β 395. 0^{h} 33^{m}·2, S. 25° 12′ : 6·1, 5·3 : 104°·7 : 0″·6. Bin. A., 25 years. Oliver, '09 : 271°·7 : 0″·7. Large p.m. of 1″·4.

β 734. 0^{h} 48^{m}·7, S. 24° 26′ : 6, 11 : 348°·9 : 10″·7.

I 446. 1^{h} 28^{m}·0, S. 30° 42′ : 5·8, 10 : 130° ± : 1″·3.

τ (h. 3447). 1^{h} 32^{m}·3, S. 30° 19′ : 6½, 8 : 75°·4 : 3″·3 : '37. Scott, '02 : 97° : 1″·8.

I 448. 1^{h} 35^{m}·1, S. 25° 26′ : 6·4, 12 : 5° ± : 12″.

ε (h. 3461). 1^{h} 41^{m}·9, S. 25° 3′ : 5, 9 : 69°·6 : 5″·5, '37. Scott, '02 : 53°·7 : 4″·7.

See 492. XXIII^{h} 31^{m}·4, S. 27° 56′ : 6·2, 8·1 : 265°·1 : 0″·4.

h. 5417. XXIII^{h} 40^{m}·3, S. 26° 41′ : 6½, 9½ : Scott, 320°·1 : 8″·9.

δ (β 1013). XXIII^{h} 44^{m}·8, S. 28° 35′ : 4·7, 12·5 : 228°·9 : 3″·3.

h. 5423. XXIII^{h} 45^{m}·7, S. 25° 47′ : 6½, 12. See, 305°·5 : 13″·6.

h. (Cape Obs.). XXIII^{h} 50^{m}·2, S. 27° 30′ : 6, 7 : 267°·5 : 6″·8.

Variable Star.

Y (var.). XXIII^{h} 4^{m}·3, S. 30° 34′ : 7–8–8·9 : Fleming.

Nebulæ.

253 (H. V 1). 0^{h} 43^{m}·6, S. 25° 44′ : very bright large neb. 24′ × 3′.

288 (H. VI 20). 0^{h} 48^{m}·8, S. 27° 1′. Bright cl. 5′ diam., 12–16 m^{g}.

613 (H. I 281). 1^{h} 31^{m}·2, S. 29° 49′ : Bright large neb.

SCUTUM SOBIESKII.

This asterism, which worthily associates the memory of the Polish hero with the most brilliant part of the Galaxy visible in our latitudes, is full of splendid telescopic fields ;

and the very ground of the Milky Way seems here resolvable.

DOUBLE STARS.

Σ 2303. xviii^h 15^m·8, S. 8° 1′ : 6·7, 9·2 : 216°·4 : 3″·2 : ysh., o. Bowyer, '05 : 223°·8 : 2″·4.

Σ 2306. xviii^h 17^m·7, S. 15° 8′ : 7·2, 7·9 : 219°·5 : 12″·8 : y., v. bl. Beautiful. Mitchel divided 7·9 : 8·2, 8·5 : 65°·1 : 1″. Fixed.

Σ 2313. xviii^h 20^m·4, S. 6° 39′ : 7·2, 8·5 : 199° : 6″·1 : yw., ash.

Σ 2325. xviii^h 27^m·0, S. 10° 52′ : 6, 9·3 : 257°·9 : 12″·3. Fr., w., blsh.

Σ 2337. xviii^h 30^m·4, S. 14° 46′ : 7·8, 8·8 : 297°·4 : 16″·4 : w., blsh.

Σ 2373. xviii^h 41^m·4, S. 10° 35′ : 7·1, 8·1 : 339°·1 : 4″·2 : w., ashy.

Σ 2391. xviii^h 44^m·4, S. 6° 7′ : 6·2, 9 : 332°·6 : 37″·9.

STARS WITH REMARKABLE SPECTRA, AND VARIABLES.

Es.-Birm. 527. xviii^h 13^m·8, S. 13° 28′ : 9·2 : R. : Hn. IV ?

Star. xviii^h 14^m·6, S. 11° 40′ : 8·8 : V : Fleming.

Var. xviii^h 22^m·2, S. 9° 14′ : 7·5–8·5 : Algol type. Cannon.

Es.-Birm. 542. xviii^h 28^m·1, S. 14° 55′ : 6·7 : III : D'A.

Es.-Birm. 551. xviii^h 34^m·3, S. 13° 52′ : 8·2 : III : D'A.

RR (var.). xviii^h 36^m·6, S. 4° 10′ : 7·9–8·3 : Ichinohe.

Var. xviii^h 39^m·4, S. 7° 49′ : 7·5–8·4 : Cannon.

Es.-Birm. 562. xviii^h 40^m·4, S. 6° 43′ : 8·8 : R. : W. III. Es. B. notes 7·5, red orange 6′ *n*.

Star. xviii^h 40^m·2, S. 7° 11′ : 8·2 : Hy. : Fleming.

R (var.). xviii^h 43^m·2, S. 5° 48′ : 4·8–7·8 : 71^d·1 : Piggott. Es. finds the bands fade out at max., so that the spectrum varies from nearly continuous to well-marked III. Confirmed by Curtiss at the Lick Observatory, who finds at max. bright hydrogen lines, and at min. solar type.

RS (var.). xviii^{h} 44^{m}·8, S. 10° 20′ : 8–9·8 : 0^{d}·7 : Algol type. Cannon.

Es.-Birm. 569. xviii^{h} 45^{m}·4, S. 6° 0′ : 6·8 : OR. : W. III.

S (var.). xviii^{h} 46^{m}·4, S. 8° 0′ : 7·1– ? B. IV. Wide pair, 7, 8 : OR., bl. *sp.*

Clusters and Nebulæ.

6603 (M. 24). xviii^{h} 13^{m}·8, S. 18° 27′ : Magnificent region, visible to the unaided eye as a kind of protuberance of the Galaxy ; and so considered by h., who gives stars 15 m^{g}. It is accompanied by two little pairs. 2° *n* of *μ* Sagittarii.

6611 (M. 16). xviii^{h} 14^{m}·5, S. 13° 49′. Grand cl.

6613 (M. 18). xviii^{h} 15^{m}·2, S. 17° 10′. Glorious field in very rich vicinity ; *s* lies a region of surpassing splendour.

6618 (M. 17). xviii^{h} 16^{m}·3, S. 16° 13′ : The ‘horseshoe’ neb. visible in finder, 1° *n* of M. 18, described by Sm. as a magnificent, arched, and irresolvable nebulosity—in a splendid group of stars. Well has he observed, ‘The wonderful quantity of suns profusely scattered about here would be confounding, but for their increasing our reverence of the Omnipotent Creator, by revealing to us the immensity of the creation.’ The neb., however, Huggins finds to be gaseous ; and Holden traces some changes of position with regard to neighbouring stars.

6694 (M. 26). xviii^{h} 40^{m}·8, S. 9° 29′. Coarse cl.

6712 (H. I 47). xviii^{h} 48^{m}·7, S. 8° 48′ : Beautiful resolvable neb.

SERPENS.

A long rambling constellation, mixed with Ophiuchus. It contains some fine telescopic objects.

DOUBLE STARS.

2 (β 348). xiv^{h} 57^{m}·7, N. 0° 14′: De., 5·1, 7·4: 114°·6: 0″·5. Furner, '08: 110°·7.

Σ 1931. xv^{h} 14^{m}·2, N. 10° 43′: 6·2, 7·6: 172°·5: 13″·1: w. Fr., '15: 169°·5. Pale y., blsh.

β 943. xv^{h} 14^{m}·3, N. 1° 14′: 6·6, 12·2: 92°·5: 2″·3.

5 (Σ 1930). xv^{h} 15^{m}·2, N. 2° 5′: 5, 10: 41°: 10″·1: ysh., o. c.p.m. of 0″·6. Very near M. 5 Libræ.

6 (β 32). xv^{h} 17^{m}·0, N. 1° 0′: De., 4·6, 9·4: 13°·2: 2″·3. Sa., y., grey bl. Burton, *comes*, est. 80°: 50″.

Σ 1940. xv^{h} 22^{m}·5, N. 18° 27′: 8·2, 8·7: 325°·5: 1″·5.

Σ 1943. xv^{h} 23^{m}·7, N. 5° 38′: 8·5, 9: 153°·5: 5″·3.

Σ 1944. xv^{h} 23^{m}·7, N. 6° 22′: 7·5, 8·1: 341°·6: 1″·3. Furner, '12: 320°·8: 1″.

Σ 1945. xv^{h} 24^{m}·3, N. 14° 59′: 8·8, 9·5: 273°·2: 30″·7: (β, '04: 291°·7: 32″·5): *comes* to 9·5, 9·5: 280°·4: 8″·8. Ha., *comes*, 14·5: 27°·5: 23″·1.

Σ 1949. xv^{h} 26^{m}·2, N. 13° 20′: 9, 9·2: 213°·2: 16″·4.

Σ 1952. xv^{h} 28^{m}·1, N. 9° 56′: 7·8, 9: 221°·9: 15″·9. A. doubles 7·8: 8·5, 10·2: 22°·5: 0″·5.

δ (Σ 1954). xv^{h} 31^{m}·0, N. 10° 48′: 3, 4: 197°·3: 2″·7: y.w., ashy, '33. Ph., '13: 183°·6: 3″·9. W., blsh. w., '50. Fr., '15: 188°·2: w., grnsh. y.

ι (Hu. 580). xv^{h} 38^{m}·2, N. 19° 55′: 5, 5: 71°·8: 0″·2. A., '12: 65°·2.

β 619. xv^{h} 39^{m}·4, N. 13° 55′: 6½, 7: 359°·8: 0″·6.

A. 2230. xv^{h} 40^{m}·0, N. 2° 46′: 6·1, 13·2: 102°·6: 3″·6.

α (h. 1277). xv^{h} 40^{m}·3, N. 6° 41′ : β, 2, 12 : 350°·6 : 58″·1. Obvious, 9⅓-in., '67. Sa., 2½-in., '74.

β (Σ 1970). xv^{h} 42^{m}·5, N. 15° 40′ : 3, 9·2 : 265° : 30″·6 : blsh. w., o. Pale y., lilac, 9⅓-in., '72. So Fr.

Σ 3126. xv^{h} 45^{m}·9, S. 2° 56′ : 9·2, 9·2 : 282°·3 : 2″·4.

Σ 1978. xv^{h} 47^{m}·2, N. 14° 57′ : 8·5, 9 : 235°·2 : 15″·3.

Σ 1979. xv^{h} 47^{m}·2, N. 22° 43′ : 8·5, 9·1 : 247°·4 : 9″·4.

Σ 1985. xv^{h} 51^{m}·8, S. 1° 56′ : 7, 8·1 : 326°·6 : 5″·4 : yw., ash. Fr., '15 : 339°·3.

Σ 1986. xv^{h} 51^{m}·8, N. 10° 20′ : 8·2, 8·8 : 94°·4 : 14″·4.

Σ 1988. xv^{h} 53^{m}·0, N. 12° 43′ : 7·5, 8·2 : 266°·3 : 2″·9. Doo., '11 : 260°·4.

Σ 1987. xv^{h} 53^{m}·2, N. 3° 38′ : 7·2, 8·7 : 324° : 10″·3. w., ash. W., lilac, '50.

Σ 3101. xv^{h} 54^{m}·7, S. 2° 51′ : 8·2, 8·5 : 60°·3 : 2″ : yw.

Σ 1990. xv^{h} 55^{m}·5, N. 22° 1′ : 8, has at 59° : 56″·2, double *comes* : 8·5, 8·5 : 208°·4 : 3″·8.

OΣ 303. xv^{h} 57^{m}·2, N. 13° 31′ : 7·4, 7·9 : 134°·4 : 0″·8. Greenw., '12 : 150°·2.

Σ 2008. xvi^{h} 3^{m}·4, S. 2° 27′ : 8·5, 9·2 : 58°·4 : 8″·8.

Σ 2017. xvi^{h} 8^{m}·5, N. 14° 46′ : 7·7, 8·4 : 249°·7 : 25″. Fr. '14 : 253°·9 : 27″·7. A pretty pair.

49 (Σ 2021). xvi^{h} 9^{m}·6, N. 13° 45′ : 6·7, 6·9 : 316°·7 : 3″·2 : '32. Fr., '15 : 337°·7 : 3″·7 : yw. Sa., minute *comes f.*

Σ 2023. xvi^{h} 10^{m}·6, N. 5° 44′ : 8, 9 : 235° : 1″·5. Do., '03 : 227°·5 : 1″·7.

Σ 2027. xvi^{h} 11^{m}·3, N. 4° 28′ : 8·2, 8·2 : 75° : 2″.

Σ 2041. xvi^{h} 17^{m}·6, N. 1° 25′ : 7·3, 10·5 : 4°·4 : 3″·1 : y., o. Sa., most beautiful ; 10·5, bl. De., 7·2, 9·9.

Σ 2119. xvii^{h} 2^{m}·0, S. 13° 49′ : 8, 8 : 17°·8 : 2″.

β 282. xvii^{h} 10^{m}·8, S. 14° 30′ : 6·2, 11·8 : 151°·7 : 4″·4.

ν (H*h*. 535). xvii^{h} 16^{m}·3, S. 12° 46′ : β, 4·9, 9·5 : 29°·7 : 46″·9.

Σ 2204. xvii^{h} 41^{m}·8, S. 13° 17′ : 7, 7·2 : 23°·6 : 14″·3.

Σ 2250. xvii^{h} 55^{m}·0, S. 6° 51′ : 8, 9 : 346°·5 : 7″·7.

OΣΣ 165. xviii^{h} 2^{m}·1, N. 4° 33′ : De., 7·4, 7·9 : 142°·3 : 66″ : yw. Fine region.

Σ 2294. xviii^{h} 10^{m}·5, N. 0° 9′ : 7·4, 7·7 : 91°·9 : 1″·1. Bryant, '12 : 287°·8 : 0″·4.

59 (Σ 2316). xviii^{h} 23^{m}·1, N. 0° 8′ : 5·5, 7·8 : 314°·1 : 3″·9 : y., bl. h., or., grn. Brightest of vicinity.

Σ 2322. xviii^{h} 26^{m}·1, N. 4° 0′ : 5·7, 11 : 170°·5 : 19″·6.

Σ 2324. xviii^{h} 26^{m}·9, N. 1° 20′ : 8·2, 8·5 : 146° : 2″·4.

Σ 2347. xviii^{h} 33^{m}·8, S. 0° 27′ : 7·5, 9·4 : 259°·3 : 3″·2.

Σ 2361. xviii^{h} 36^{m}·6, N. 3° 0′ : 8·3, 8·8 : 211°·4 : 25″·1.

Σ 2375. xviii^{h} 41^{m}·5, N. 5° 24′ : 6·2, 6·6 : (113°·7) : 2″·2.

θ (Σ 2417). xviii^{h} 52^{m}·2, N. 4° 6′ : 4, 4·2 : 103°·8 : 21″·6 : yw. Hu., '02 : 22″·2. Sm. first suggested variability, and Gould found var. from 4·1 to 4·6. A difference of 1·3 m^{g}. was noted between the stars at Harvard on one occasion. Relatively fixed with c.p.m. (11′ *n*, Miss Brown sees a red star. Es., 8·5 : III.) This noble pair, in a very fine field, lies to the naked eye in a dark space between two streams of the Galaxy. There is a traditional misrepresentation of the latter in this region, where both streams were misdrawn and misplaced on the older globes and maps. Much fine sweeping occurs among moderate-sized stars between these branches, showing that the darkness to the naked eye is due to the absence of the unresolved background. In h.'s 'Outlines of Astronomy' is a very accurate description of the Galaxy, and it has been carefully delineated by Heis, Gould, and Boeddicker. And with the camera by Barnard, and Wolf, Franklin-Adams, Bailey.

STARS WITH REMARKABLE SPECTRA, AND VARIABLES.

S (var.). xv$^{\rm h}$ 17$^{\rm m}$·9, N. 14° 36′: 7·8–14: 368$^{\rm d}$·5: Harding.
τ^4. xv$^{\rm h}$ 32$^{\rm m}$·8, N. 15° 21′: 6·7: R.: D'A. III.
Es.-Birm. 437. xv$^{\rm h}$ 39$^{\rm m}$·4, S. 1° 27′: 10: R.: Hn.
R (var.). xv$^{\rm h}$ 47$^{\rm m}$·0, N. 15° 23′: 5·6–13: 357$^{\rm d}$·2: Harding.
U (var.). xvi$^{\rm h}$ 3$^{\rm m}$·5, N. 10° 9′: 7·7–12: 240$^{\rm d}$: Fleming.
47. xvi$^{\rm h}$ 4$^{\rm m}$·6, N. 8° 45′: 6·4: III: D'A. A 7·5 m$^{\rm g}$., 4′ *n*, similar.
W (var.). xviii$^{\rm h}$ 5$^{\rm m}$·2, S. 15° 34′: 8·5–10: 14$^{\rm d}$·1: Algol type. Cannon.
T (var.). xviii$^{\rm h}$ 24$^{\rm m}$·9, N. 6° 14′: 9·1$<$13·5: 341$^{\rm d}$·8: Baxendell.

CLUSTER AND GROUPS.

Group. ± xviii$^{\rm h}$ 2$^{\rm m}$, S. 3° 10′. Bright open triangle.

Group. ± xviii$^{\rm h}$ 22$^{\rm m}$, N. 1° 41′. Curious rhomboid: 8, 8, 10, 10.

6633 (H. VIII 72). xviii$^{\rm h}$ 24$^{\rm m}$·6, N. 6° 29′. Very fine, with star 7 m$^{\rm g}$. in large field; eye object. Baxendell found var. T, among outliers; compare M. 80 in Scorpio. Between it and θ, nearer the former, is a beautiful large cloud of stars, chiefly 8 and 9 m$^{\rm g}$., a nearer part, apparently, of the Galaxy; visible to naked eye, and requiring a large field.

Group. ± xviii$^{\rm h}$ 34$^{\rm m}$, N. 5° 16′. Very large, subdivided, chiefly 9 and 10 m$^{\rm gs}$.

SEXTANS.

A modern asterism, as its name denotes, being one of the minor constellations, formed by Hevelius out of unclaimed stars lying between the ancient ones.

DOUBLE STARS.

Σ 1371. ix^h 31^m·3, N. 4° 16: 8, 10·5: 279°·8: 7″·1: ysh., o. h., 10·5: dusky red; very remarkable col.

Σ 1377. ix^h 39^m·3, N. 3° 1′: 7·9, 11·1: 142°·3: 3″·3.

8 (A.C. 5). ix^h 48^m·5, S. 7° 43′: β, 5½, 5¾: 161°: 0″·2: '78. Bin. P. about 70 yrs.? Bryant, '12: 68°: 0″·4. *Comes*, 9: 145°·3: 35″·9.

9 (S. 605). ix^h 49^m·9, N. 5° 20′: β, 6·7, 9: Doubiago, 290°·7: 51″·1. Red, bl., '52. Fr., or., '77.

Σ 1404. x^h 0^m·2, S. 1° 19′: 8·7, 9·3: 292°·8: 6″·1.

Σ 1441. x^h 27^m·0, S. 7° 13′: 6·4, 9·9: 169°·3: 2″·6: gold, o.

Σ 1452. x^h 31^m·7, N. 2° 59′: 9, 9·1: 329°·7: 10″·1.

35 (Σ 1466). x^h 39^m·2, N. 5° 10′: 6·1, 7·2: 240°·5: 6″·7: y., bl. Y., ruddy, '52. So Fr., '77. Much diff. as to colours. Fine field, especially if large.

Σ 1470. x^h 42^m·2, S. 5° 21′: 8·2, 8·5: 6°·2: 1″·4. Lunt, '00: 12°·5.

STARS WITH REMARKABLE SPECTRA, AND VARIABLES.

R (var.). ix^h 38^m·8, S. 7° 44′: 9·5–10·6: Irreg.: Wells.

Var. ix^h 46^m·9, S. 1° 39′: 8·9: IV: Fleming.

T (var.). ix^h 49^m·3, N. 2° 25′: 8·9–9·6: Leavitt.

Ll. 19662. ix^h 59^m·8, S. 9° 11′: Susp. var. by Gore. Ll., 4·5; Harding, 5; Heis, 6–7; Gore, 7.

18. x^h 6^m·9, S. 8° 1′: 6: pale or.; forms a beautiful combination with 17, pale bl., 48^s *p*. Es.

S (var.). x^h 30^m·9, N. 0° 5′; 8·9–10·5: Leland.

NEBULÆ.

3115 (H. I 163). x^h 1^m·2, S. 7° 20′ Very distinct, with much brighter centre, bearing magnifying unusually well.

3166, 3169 (H. I 3, 4). x^h 9^m·6, N. 3° 49′. Two very faint nebulæ in a glorious field. H. missed the fainter, though he observed the other 4 times. D'A. saw 3, and called H. I 3 *admodum luminosa*. Such was the working of the Copenhagen 11-in. achr.

TAURUS.

An interesting constellation containing two beautiful groups familiar to the first beginner in stellar astronomy, The Pleiades, and Hyades. Neither of these, however, is sufficiently concentrated to make a good telescopic object, excepting in an unusually large field. The 6 principal stars of the Pleiades are evident to any clear sight; but glimpses of more are easily attainable. Möstlin is said by Kepler to have distinctly made out 14, the relative positions of 11 being estimated with surprising accuracy in the absence of a telescope. Carrington and Denning have seen 14; even 16 are spoken of by Carl von Littrow, who says 11 are not unfrequently perceived. A beautiful triangle of small stars will be found near the *lucida*, Alcyone (111^h $42^m \cdot 7$, N. 23° 52′). I have noticed the remarkable absence of colour in the group, except in one minute ruby star, and an or. outlier. Wolf has charted 499 stars here down to 14 m^g. The photographic plate shows over 2000.

Pickering found bright lines in Pleione which were confirmed by Keeler, but since 1905 the lines have been dark. In Alcyone Campbell sees red hydrogen line bright while the others are dark. Merrill finds a similar combination in Electra, while in Merope, F is also bright. Spect. Obs. suggests that the nebula is not gaseous. In the case of the Hyades, Boss finds 41 stars whose p.m. converge to near γ Tauri.

DOUBLE STARS.

Σ 380. III^{h} 17^{m}·4, N. 8° 29′ : 8·3, 9·3 : 90°·1 : 1″·2. β, '04 : 63°·2.

Σ 383. III^{h} 19^{m}·7, N. 17° 17′ : 8, 9 : 120°·1 : 5″·7.

Σ 394. III^{h} 23^{m}·4, N. 20° 2′ : 7, 8 : 163°·3 : 6″·7 : ysh., blsh.

β 879. III^{h} 24^{m}·2, N. 11° 6′ : 6·5, 12·5 : 71°·1 : 24″·6.

Σ 401. III^{h} 26^{m}·5, N. 27° 18′ : 6·5, 7 : 270° : 11″·1. 10′ *n*, a little *p*, is Σ I 7 : 6·9, 7·4 : 233° : 44″.

Σ 403. III^{h} 26^{m}·6, N. 19° 30′ : 8·5, 8·5 : 181°·7 : 2″·9.

Σ 406. III^{h} 26^{m}·6, N. 4° 53′ : 7, 9 : 123°·8 : 9″·3.

7 (Σ 412). III^{h} 29^{m}·7, N. 24° 12′ : 6·6, 6·7 : 269°·9 : 0″·7 : ysh., '30. A., '12 : 127°·7 : 0″·2. Bin. Elong. 5½-in., '61. *Comes*, 10 : β, '04 : 59°·1 : 22″·4.

Σ 414. III^{h} 29^{m}·8, N. 19° 32′ : 8, 8 : 185°·6 : 7″·1. 24^{s} *f* is Σ 416 rej. Es., triple : 8·5, 12·3, 9·7 : β, 292°·9, 56°·5 : 22″·6, 26″·4.

Σ 427. III^{h} 35^{m}·7, N. 28° 31′ : 6·6, 7·4 : 208°·6 : 6″·7.

Σ 430. III^{h} 36^{m}·2, N. 4° 52′ : 6, 9, 9·8 : 55°·3, 301°·9 : 26″·6, 37″·4 : v.y., o, o.

β 1041. III^{h} 39^{m}·7, N. 27° 39′ : 6·2, with 6·3 (at 38°·3 : 122″·6), 12·8 : 347°·8 : 7″·9.

30 (Σ 452). III^{h} 43^{m}·9, N. 10° 54′ : 4·5, 9·6 : 57°·9 : 8″·9 : blsh. grn., o. Pale ysh., grnsh., '50.

OΣ 64. III^{h} 45^{m}·2, N. 23° 37′ : 7, 9·9, 9 : 239°, 237° : 3″·3, 10″·6.

OΣ 65. III^{h} 45^{m}·5, N. 25° 20′ : 6·5, 6·8 : 210°·8 : 0″·8. Bowyer, '12 : 202°·9 : 0″·4.

Σ 457. III^{h} 45^{m}·6, N. 22° 26′ : 8·8, 8·8 : 104°·8 : 1″·3. β, *comes*, 12·6 : 338°·8 : 18″·2.

Σ 479. III^{h} 56^{m}·2, N. 22° 59′ : 7, 7·9, 9·7 : 128°·5, 240°·5 : 7″·4, 58″·1 : w., w., o. 7½, 9, 10 : yw., 2 blsh., '55.

OΣ 70. III^h 57^m·4, N. 9° 47′ : 5·8, 11·8 : 227°·4 : 12″·1.

Σ 491. IV^h 1^m·5, N. 10° 46′ : 8·2, 8·8 : 111°·4 : 2″·7.

Σ 493. IV^h 2^m·5, N. 5° 29′ : 8·5, 9 : 98°·1 : 1″·8 : y.

Σ 495. IV^h 3^m·2, N. 14° 57′ : 6, 8·8 : (220°·7) : 3″·6.

OΣ 72. IV^h 3^m·4, N. 17° 8′ : 6·1, 9·2 : 322°·8 : 4″·5.

Σ 494. IV^h 4^m·1, N. 22° 54′ : 7·7, 7·7 : 186°·3 : 5″·1.

Σ 515. IV^h 9^m·2, N. 2° 40′ : 8·3, 8·3 : 43°·9 : 3″·5.

β 1278. IV^h 9^m·2, N. 8° 41′ : 6·5, 13·7 : 303°·4 : 7″·4. *Comes*, 12·5 : 252°·3 : 55″·3.

46 (A 1938). IV^h 9^m·2, N. 7° 31′ : 5·8, 6·1 : 315° : 0″·1.

47 (β 547). IV^h 9^m·6, N. 9° 4′ : 5, 8 : 359°·7 : 0″·9. *Comes*, 9 : 224°·5, 31″·5.

Σ 523. IV^h 15^m·0, N. 23° 33′ : 7·2, 9·2 : 165° : 10″·3.

55 (OΣ 79). IV^h 15^m·3, N. 16° 20′ : 7, 8·8 : 23°·7 : 0″·8. A., ’12 : 323°·3 : 0″·4. Bin. 88·9 years.

φ (OΣΣ 48). IV^h 15^m·4, N. 27° 10′ : De., 5, 8 : 245°·5 : 53″·6 : y., o. Pale r., bl., ’50. Fr., ’13 : 249° : 52″·9.

β 87. IV^h 17^m·6, N. 20° 38′ : 5·7, 8·8 : 169°·4 : 2″. Red, bl. Sa., very lovely. Es.-Birm., 86 ; possibly var.

χ (Σ 528). IV^h 17^m·7, N. 25° 27′ : 5·7, 7·8 : 25°·3 : 19″·3 : w., blsh. w. Fr., 7·8 lilac, or ruddy, ’79.

Σ 535. IV^h 18^m·8, N. 11° 12′ : 6·7, 8·2 : 353°·9 : 1″·9 : ysh., blsh. Ph., 326°·4 : 1″·3, ’14.

62 (Σ 534). IV^h 19^m·1, N. 24° 7′ : 6·2, 8 : 289°·7 : 28″·9 : w., o. 8., bl., ’50. Fine field.

66 (Hu. 304). IV^h 19^m·8, N. 9° 17′ : 5·9, 5·9 : 23°·9 : 0″·2. Doo., ’10 : 36°·9 : 0″·3.

$\kappa^1\kappa^2$ (Σ I 9). IV^h 20^m·6, N. 22° 7′ : 5, 6. A little pair between, De., 11·2, 11·6. β, 329°·9 : 5″·5.

Σ 545. IV^h 22^m·4, N. 18° 2′ : 7·5, 9·3 : 57° : 19″·1 : w., o. 9·3 blsh., ’78.

Σ 548. IV^h 22^m·8, N. 30° 2′ : 6, 8 : 35°·9 : 14″·2 : ysh., blsh.

θ (Σ I 10). IV^h 24^m·0, N. 15° 48′ : 4·7, 5 : 346°·2 : 337″·4 : w., ysh. Among Hyades; pair to naked eye. c.p.m.

Hu. 1080. IV^h 24^m·6, N. 15° 59′ : 6·5, 7·5 : 263°·1 : 0″·4.

80 (Σ 554). IV^h 25^m·5, N. 15° 28′ : 6·5, 9 : 12°·9 : 1″·7.

Σ 559. IV^h 28^m·9, N. 17° 51′ : 7, 7 : 278°·7 : 3″.

α (Σ II 2). IV^h 31^m·3, N. 16° 21′ : 1, 11·2 : 36° : 109″ : gold, o. Aldebaran, in Arabic, *the hindmost*, because he seems to drive the Pleiades before him. The minute attendant is a good light test. D. has seen it with $2\frac{3}{4}$-in., Wa. with $1\frac{7}{8}$-in.[1] My $3\frac{7}{10}$-in. showed it certainly, but not without much attention; 144 suited it better than 80. De. makes it 10·3. β divides it into 11, 13·5 : 279° : 1″·8, which may be moving; he also detected a fainter attendant 109°·0 : 31″·4, which has the same p.m. as α, whereas the pair is gradually being left behind (Fr., '14 : 34°·2 : 119″·9). Occultations of Aldebaran are not infrequent, as it lies in the Moon's way; they are striking phenomena, and to some observers are apt to exhibit the singular optical illusion of *projection*. Aldebaran is a beautiful example of the II or solar type of spectrum. Goodacre, pair 62^s *p*. Es., 11·7, 11·7 : 331°·2 : 3″·7.

88 (OΣΣ 52). IV^h 31^m·2, N. 10° 0′ : De., 4, 7·5 : 299° : 69″·2 : yw., yr. Y., pale lilac, '50.

Σ 569. IV^h 31^m·9, N. 9° 3′ : 8·2, 8·7 : 132°·8 : 7″·9.

Σ 567. IV^h 32^m·0, N. 19° 20′ : 8·5, 9 : 302°·9 : 1″·4 : y. Greenw., '12 : 323°·7 : 1″·8.

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[1] It may be remarked, however, once for all, that personal equation and atmospheric conditions enter so largely into these estimates that the employment of such tests is seldom conclusive in its results.

σ^2, σ^1 (Σ I 11). iv$^{\text{h}}$ 34$^{\text{m}}$·7, N. 15° 45′ : 5·2, 5·7 : wide.

τ (OΣΣ 54). iv$^{\text{h}}$ 37$^{\text{m}}$·4, N. 22° 49′ : De., 5, 7·2 : 212°·4 : 62″·9 : w., bl. Spec. Bin.

96 (β 551). iv$^{\text{h}}$ 45$^{\text{m}}$·2, N. 15° 46′ : 6, has double *comes* (at 57°·2 ; 30″·7), 11, 12·8 : 205°·7 : 6″·3.

99 (β 1045). iv$^{\text{h}}$ 53$^{\text{m}}$·0, N. 23° 50′ : 6, 12·3 : 6°·4 : 6″·3.

Σ I 12. iv$^{\text{h}}$ 56$^{\text{m}}$·8, N. 26° 34′ : 6, 7 : 158°·6 : 78″·8. A., divides 6 : 7·2, 9·8 : 354°·5 : 0″·3.

OΣ 95. iv$^{\text{h}}$ 59$^{\text{m}}$·6, N. 22° 54′ : 6·6, 7·2 : 344°·2 : 0″·5. Greenw., '12 : 320°·9 : 0″·8. Bin.

103 (Edgecombe). v$^{\text{h}}$ 3$^{\text{m}}$·2, N. 24° 9′ : β, 6, 12·5 : 149°·6 : 13″·3. A 9 m$^{\text{g}}$., 197° : 35″·5.

Σ 670. v$^{\text{h}}$ 12$^{\text{m}}$·0, N. 18° 21′ : 7·7, 8·2 : 171°·1 : 2″·3. w., blsh. Bowyer, '08 : 166°·8 : 2″·3.

Σ 671. v$^{\text{h}}$ 12$^{\text{m}}$·4, N. 26° 0′ : 8·5, 9 : 125°·9 : 17″·2.

Σ 680. v$^{\text{h}}$ 14$^{\text{m}}$·5, N. 20° 4′ : 6·3, 10·2 : 201°·8 : 8″·7 : y., o. Bird, *comes* dull red, bearing any illumination. Last of curious series of 6 stars nearly *f* of each other. The next *p* is Σ 674 : 6·5, 9·5 : 147°·3 : 10″·5.

Σ 686. v$^{\text{h}}$ 16$^{\text{m}}$·0, N. 23° 58′ : 7·9, 8·1 : 219°·9 : 9″·2.

Σ 697. v$^{\text{h}}$ 18$^{\text{m}}$·9, N. 15° 59′ : 7·2, 8·2 : 285° : 26″.

Σ 694. v$^{\text{h}}$ 19$^{\text{m}}$·1, N. 24° 54′ : 8·2, 8·2 : 4°·2 : 1″·3. Ha., *comes*, 15 : 338°·6 : 8″·7.

111 (H*h*. 166). v$^{\text{h}}$ 19$^{\text{m}}$·8, N. 17° 18′ : β, '03 : 270°·4 : 80″·6. p.m. 0″·2. H., 1782 : 46″·7. Y., lilac, '51.

115 (OΣ 107). v$^{\text{h}}$ 22$^{\text{m}}$·5, N. 17° 53′ : 6, 10·8 : 304°·6 : 10″· *Comes*, 12·5, Hu., 341°·1 : 10″.

118 (Σ 716). v$^{\text{h}}$ 24$^{\text{m}}$·3, N. 25° 5′ : 5·8, 6·6 : 196°·8 : 4″·9 : w., blsh. w. c.p.m. Ph., '14 : 201°·4.

OΣΣ 64. v$^{\text{h}}$ 25$^{\text{m}}$·1, N. 18° 21′ : De., 7·2, 7·7 : 20°·7 : 53″·5. β sees *comes* to 7·2, 13 : 122°·2 : 10″·6.

Σ 730. v$^{\text{h}}$ 27$^{\text{m}}$·6, N. 17° 0′ : 6·5, 7 : 141°·8 : 9″·8 : v.w.

Ysh., blsh.; 7, 7·3, 9-in., '72. So Fr. and nearly equal, '76. De., 5·8, 6·7.

Σ 740. v^h 31^m·6, N. 21° 9′ : 8·2, 9 : 118°·8 : 21″·8 : y., o. 49′ *n* is Σ 742 : 7·2, 7·8 : 246°·2 : 3″·3 : y., w., '30. Greenw., '11 : 262°·3.

Σ 749. v^h 31^m·9, N. 26° 53′ : 7·1, 7·2 : 23°·4 : 0″·7. Ph., '14 : 347°·3 : 0″·9. Buffham, divided with 6½-in. 'With' spec.

Σ 755. v^h 34^m·3, N. 23° 15′ : 8·3, 9 : 315°·7 : 6″.

Σ 766. v^h 35^m·7, N. 15° 18′ : 6·8, 8 : 276°·1 : 9″·6.

126 (β 1007). v^h 36^m·7, N. 16° 29′ : 6, 6·2 : 266°·2 : 0″·3, '81. Single, '90. Elongated, '91. Bryant, '12 : 260°·9 : 0″·2. Bin. Per. some 35 yrs.

Σ 776. v^h 38^m·1, N. 25° 19′ : 8·2, 9·2 : 104°·7 : 2″·1.

Σ 777. v^h 38^m·5, N. 22° 10′ : 8·7, 8·8 : 85°·4 : 4″·6.

Σ 785. v^h 41^m·0, N. 25° 53′ : 6·7, 7·7 : 348°·6 : 13″·8 : w., blsh. w. Very pretty. OΣ, *comes*, 12·2 : 66°·4 : 18″·3.

Σ 787. v^h 41^m·2, N. 21° 17′ : 8·1, 8·5 : 78°·5 : 1″·4. Bowyer, '12 : 69°·6 : 1″.

133 (h. 3279). v^h 43^m·2, N. 13° 52′ : 6, β, 12·4, 12·2 : 297°, 182°·2 : 17″·8, 25″·3.

OΣ 118. v^h 43^m·6, N. 20° 51′ : 6·2, 7·7 : 318°·7 : 0″·6 : ysh., o. Bowyer, '12 : 322°·3 : 0″·5. A 7·2; 160°·6 : 75″·5.

Σ 806. v^h 46^m·4, N. 17° 52′ : 8·8, 8·8 : 198°·8 : 10″·7 Jonckheere doubled *n* star. A., 9·7, 11·2 : 72° : 1″·7.

136 (β 1054). v^h 48^m·3, N. 27° 36′ : 6, 12 : 232°·2 : 15″.

Stars with Remarkable Spectra, and Variables.

Es.-Birm. 76. III^h 37^m·7, N. 14° 32′ : 8·8 : R. : h. III.

X (var.). III^h 48^m·9, N. 7° 32′ : 6·6–7·2 : Gould.

λ (var). III^{h} 56^{m}·2, N. 12° 16′ : 3·3–4·2 : 3^{d}·9 : Algol type. Baxendell.

RW (var.). III^{h} 59^{m}·0, N. 27° 54′ : 7·1–11 : 2^{d}·7 : Algol type. Fleming.

Es.-Birm. 83. IV^{h} 9^{m}·8, N. 14° 21′ : 7·5 : Y.R. : III. Vogel.

Es.-Birm. 84. IV^{h} 16^{m}·3, N. 27° 10′ : 7·5 : R. : Fr. III ?

T (var.). IV^{h} 17^{m}·3, N. 19° 21′ : 9·2<13·5 : Hind. *nf*, the site of Hind's curious var. neb. In 1900, Jan. 20, seen with difficulty with 36-in. at Lick Observatory.

Es.-Birm. 86. IV^{h} 17^{m}·7, N. 20° 38′ : 6·5 : R. : Se. III ?

Es.-Birm. 87. IV^{h} 19^{m}·0, N. 22° 46′ : 8 : Chacornac. III.

W (var.). IV^{h} 23^{m}·4, N. 15° 56′ : 8–12·2 : Es.

R (var.). IV^{h} 23^{m}·9, N. 9° 59′ : 8–14 : 325^{d} : Hind.

S (var.). IV^{h} 24^{m}·8, N. 9° 46′ : 9·5–14 : 365^{d} : Oudemans.

Star (var.). IV^{h} 32^{m}·5, N. 18° 23′ : 7·2–7·7 : 3^{d}·1 : Müller and Kemf.

Es.-Birm. 100. IV^{h} 46^{m}·0, N. 15° 39′ : 9·4 : III : var. Es.

Es.-Birm. 101. IV^{h} 46^{m}·5, N. 28° 24′ : 8·1 : R. : h. IV. Se. Var. Es.

V (var.). IV^{h} 47^{m}·4, N. 17° 25′ : 8·3–13·6 : 170^{d}·1 : Auwers.

Es.-Birm. 104. IV^{h} 49^{m}·0, N. 22° 39′ : 9·2 : R. : IV ? : Es.

Es.-Birm. 113. IV^{h} 59^{m}·7, N. 23° 33′ : 8·5 : R. : W.

119. V^{h} 27^{m}·5, N. 18° 32′ : 4·4 : Y.R. : III : Se.

120. V^{h} 28^{m}·7, N. 18° 29′ : 5·5 : Hy. : Fleming.

Es.-Birm. 143. V^{h} 29^{m}·9, N. 25° 51′ : 8·4 : pale R. : W.

Es.-Birm. 148. V^{h} 33^{m}·6, N. 24° 57′ : 9·5 : R. : Markree Cat. IV ? Es.

Es.-Birm. 149. V^{h} 34^{m}·4, N. 23° 17′ : 7·8 : R. : Sm. III ?

Es.-Birm. 152. V^{h} 40^{m}·3, N. 24° 23′ : 8·5 : R. : Markree Cat. IV. Du. Var. 7·7–9·5 ?

Y (var.). V^{h} 40^{m}·9, N. 20° 40′ : 7·7 : R. Markree Cat. IV. Du. Var. 7–8. Webb and Birmingham.

NEBULÆ AND CLUSTERS.

1435. III^h 41^m·4, N. 23° 32′. Nebula in Pleiades, discovered by Tempel, 1859; a faint, extended, somewhat triangular haze, involving, at its *n* extremity, Merope, the bright star *sp* Alcyone, the *lucida* of the group. Suspected var., but evidence conflicting. Has been seen with less than 2-in., but invisible in the 11-in. achr, at Copenhagen, possibly from want of contrast in diminished fields; D'A. says there are nebulæ invisible or barely seen in great telescopes, which can be perceived easily in their finders. Wolf is certain that it has not changed since '64. Found readily with 5½-in., '63, Oct. 6. Very feeble, '65, Sept. 25; a mere glow when star out of field, 9-in. spec., '72, March 4; '76, Jan. 15, in presence of star, 9⅓-in. spec., 1881, Jan. 31. Goldschmidt saw it as a projection from a diffused nebulosity encompassing Pleiades; so Wolf. Temple thinks this an illusion, but it has been confirmed by photography. The photo. of the brothers Henry shows a remarkable nebulous wisp attached to Maia, and a curious narrow ray running through 6 stars for 2½′ *f.*

1647 (H. VIII 8). IV^h 41^m·4, N. 18° 55′. Stars 8·5 to 10, round wide pair.

1758 (H. VII 21). IV^h 59^m·6, N. 23° 40′. Interesting region.

1952 (M. I). V^h 29^m·7, N. 21° 58′: oblong; pale; 1° *np* ζ. Crab neb. of E. of Rosse, who considered it resolvable, with fringes, not, however, subsequently confirmed there. Se. obtained a similar result. Granular, 9⅓-in. spec. D'A., 5½′×3½′, not resolved. First seen by Bevis, 1731. Its accidental re-discovery by M., while following a comet in 1758, led to the formation of the earliest catalogue of nebulæ. Winlock, gaseous spect.

TRIANGULUM.

An ancient constellation, including several good objects.

Double Stars.

Σ 137. 1$^{\mathrm{h}}$ 30$^{\mathrm{m}}$·9, N. 20° 52′ : 8·2, 9 : 86°·6 : 3″·4.

Σ 143. 1$^{\mathrm{h}}$ 35$^{\mathrm{m}}$·8, N. 33° 56′ : 7·7, 9 : 319°·8 : 30″·3. *β*, '04 : 36″·6, from p.m.

Σ 158. 1$^{\mathrm{h}}$ 42$^{\mathrm{m}}$·1, N. 32° 46′ : 8·3, 8·8 : 246°·2 : 2″·1. Ph., '14 : 258°·1.

Σ 197. 1$^{\mathrm{h}}$ 56$^{\mathrm{m}}$·3, N. 34° 55′ : 7·3, 8·3 : 233°·6 : 18″·3. W., ashy. '33. *β*, '04 : 25″·9. r.m.

ε (Σ 201). 1$^{\mathrm{h}}$ 58$^{\mathrm{m}}$·3, N. 32° 54′ : 5·3, 11·3 : 119°·6 : 3″·7. Star 8 m$^{\mathrm{g}}$. deep or., 14$^{\mathrm{s}}$ *f*.

Σ 219. II$^{\mathrm{h}}$ 5$^{\mathrm{m}}$·5, N. 32° 59′ : 8·2, 9 : 181°·6 : 11″·4.

ι (Σ 227). II$^{\mathrm{h}}$ 7$^{\mathrm{m}}$·7, N. 29° 56′ : 5, 6·4 : 77°·9 : 3″·6 : y., bl. Exquisite, Sm. Fixed.

Σ 232. II$^{\mathrm{h}}$ 10$^{\mathrm{m}}$·0, N. 29° 16′ : 7·5, 7·5 : 245°·5 : 6″·6.

Σ 239. II$^{\mathrm{h}}$ 12$^{\mathrm{m}}$·7, N. 28° 23′ : 7, 8 : 208°·9 : 14″ : w. Fr., '14 : 211° : ysh. w., lilac. Ysh., greyish, or blsh. grey, '49, '52. Heis, naked-eye star. Se., 6, 7·5. De., 6·7, 7·5.

Σ 246. II$^{\mathrm{h}}$ 13$^{\mathrm{m}}$·8, N. 34° 7′ : 7·3, 8·5 : 122°·5 : 10″·5 : ysh., blsh.

Σ 269. II$^{\mathrm{h}}$ 24$^{\mathrm{m}}$·1, N. 29° 34′ : 7·5, 9·8 : 340°·5 : 1″·9. y., ash. 7·5 var. ? Heis, naked eye. 9·8, not seen, '50. De., 7·1, 8·4.

A 1816. II$^{\mathrm{h}}$ 24$^{\mathrm{m}}$·2, N. 36° 58′ : 6·5, 11·2 : 249°·6 : 1″·6.

Σ 285. II$^{\mathrm{h}}$ 34$^{\mathrm{m}}$·1, N. 33° 9′ : 7, 7·7 : 177°·5 : 1″·9 : y. Greenw., 169°·4 : 1″·8.

Σ 300. II$^{\mathrm{h}}$ 39$^{\mathrm{m}}$·8, N. 29° 7′ : 7·9, 8·1 : 299°·6 : 2″·9 : v.w. W., ysh., or ruddy, '50. Chapman, '11 : 306°·9 : 3″·3.

STARS WITH REMARKABLE SPECTRA, AND VARIABLE.

Es.-Birm. 35. $1^h\ 53^m{\cdot}4$, N. 30° 45′ : 7 : III : Pickering.
Es.-Birm. 50. $11^h\ 23^m{\cdot}6$, N. 36° 36′ : 7·7 : III : Du.
15. $11^h\ 30^m{\cdot}9$, N. 24° 20′ : 5·6 : III : D'A.
R (var.). $11^h\ 32^m{\cdot}2$, N. 33° 55′ : 6·5–12 : 267^d : Fleming and Es.
Es.-Birm. 55. $11^h\ 39^m{\cdot}2$, N. 32° 2′ : neb., with 7·5 *f*, R. h. III. Se.

NEBULA.

598 (M. 33). $1^h\ 29^m{\cdot}3$, N. 30° 15′. Very large, faint, ill defined, visible from its great size (h., nearly ½° *n* and *s*, in finder). A very curious object, only fit for low powers, being actually imperceptible, from want of contrast, with my 144. E. of Rosse, who saw it full of knots, found spiral arrangement; two similar curves like an S cross in the centre. Ritchey, who photographed it with the 24-in. at the Yerkes Observatory, with 4 hours' exposure, notes that the central parts appear decidedly nebulous, the outer parts consist of very faint nebulosity, and of numerous curved streams, or wisps of nebulous stars; hundreds of these star-like condensations are shown on the original negative. Closely *nf* is H. III 150, a small, bright, round neb. with gaseous spect.

URSA MAJOR.

This familiar constellation offers a large field to the persevering observer. It must be borne in mind that it extends far beyond the region occupied by 'the seven stars;' and, from the unmarked character of some parts of it, several telescopic objects will require care in their identification. It seems difficult to ascertain whence this Bear and his companion derived their preposterous length of tail. Dr. Mather, in 1712, tells a curious story, that though the Red Indians did not divide the stars into constellations, they called the stars of Ursa Major 'Paukunawaw,' that is, the Bear, long before they had any communication with Europeans.[1] H. considered that in '38 ε was the leader of the 7; but in '47, by far, η; Fr., in '78, ε decidedly *lucida*, and sequence ε η ζ α β γ δ. ζ was the first spectroscopic Binary discovered, in '88, Mrs. Fleming having found that the lines were doubled at intervals. Period, 20^{d}·54. α, β, ε are also spec. Binaries. Of the early type stars at least one in three are spec. Binaries.

Double Stars.

ο (β 1067). VIII^{h} 23^{m}·6, N. 60° 59′ : 3½, 15·2 : 191°·4 : 7″.
Σ 1232. VIII^{h} 27^{m}·2, N. 66° 34′ : 8, 8½ : 350°·2 : 31″·1.
Σ 1250. VIII^{h} 34^{m}·4, N. 52° 5′ : 8·8, 8·8 : 167°·4 : 21″·7.
Σ 1248. VIII^{h} 35^{m}·4, N. 62° 19′ : 8·3, 8·8 : 208°·7 : 18″·1.
Σ 1279. VIII^{h} 44^{m}·8, N. 39° 53′ : 8·3, 8·3 : 273°·6 : 1″·6.
Σ 1275. VIII^{h} 45^{m}·3, N. 57° 49′ : 8, 8 : 196°·1 : 2″.
Σ 1280. VIII^{h} 48^{m}·5, N. 71° 7′ : 7·5, 7·6 : 33°·9 : 7″·4 : ysh. Storey, '10 : 45°·7 : 4″·8. p.m. 1″·4.
Σ 1293. VIII^{h} 53^{m}·6, N. 54° 17′ : 7·8, 9 : 92°·2 : 18″·6.
ι (OΣ 196). VIII^{h} 53^{m}·8 N. 48° 22′ : 3·1, 10·3 : 352°·5 : 10″·8. β, '05 : 360°·1 : 8″·2. h. thought *comes* might shine by reflected light. Buffham, very dull for its size. Wa., easy with low, invisible with high powers of $4\frac{3}{10}$-in. Rapid c.p.m. Hu. *comes* double : 9·5, 9·8 : 203°·3 : 0″·9.

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[1] I am informed, however, on the highest authority, that in the language of the Cree Indians this word signifies 'Ye are alone; isolated.' The word Bear is 'Muskwa.'

κ (A 1585). VIII^h 58^m·2, N. 47° 28′ : 4, 4·2 : 283°·2 : 0″·2.

σ^2 (Σ 1306). IX^h 3^m·5, N. 67° 28′ : 5, 8·2 : 263°·5 : 4″·6 : grnsh., o. A., '12 : 147°·8 : 1″·1. *Comes*, very difficult, $3\frac{7}{10}$-in. 80 ; plain 144. Sa., *comes* var. ; 5 probably so. De.'s estimates 8 to 10. Bin.

Σ 1312. IX^h 4^m·7, N. 52° 42′ : 7·7, 8·2 : 147°·9 : 4″·5.

Σ 1315. IX^h 6^m·5, N. 62° 0′ : 7, 7·2 : 25°·5 : 24″·9.

Σ 1318. IX^h 8^m·3, N. 47° 19′ : 7·5, 8·7 : 245°·1 : 3″·5.

Σ 1321. IX^h 9^m·3, N. 53° 4′ : 7·4, 7·4 : 48°·4 : 20″·1 : y. Es., '07 : 66°·5 : 18″·8, *comes*, 14 : 282°·7 : 28″·4. p.m. 1″·7.

Σ 1331. IX^h 14^m·6, N. 61° 40′ : 8, 8 : 152°·6 : (0″·8). *Comes*, 11·5 : 200°·8 : 11″·4. Storey, '10 : 190° : 12″·4.

Σ 1341. IX^h 17^m·1, N. 50° 27′ : 8·5, 8·5 : 267°·3 : 21″·1.

OΣ 200. IX^h 19^m·4, N. 51° 55′ : 6·7, 8·4 : 335°·2 : 1″·4 : y., o.

21 (Σ 1346). IX^h 20^m·0, N. 54° 22′ : 7, 8 : 311° : 5″·7. w., blsh.

Σ 1349. IX^h 24^m·5, N. 67° 54′ : 6·8, 8 : 164°·9 : 19″·2 : w. Fr., yw., blsh. w.

23 (Σ 1351). IX^h 25^m·3, N. 63° 25′ : 3·8, 9 : 272°·4 : 22″·8 : grnsh. w., ash. Pale y., lilac or violet, '52. Bird, singularly fine, from contrast ; *comes*, 11 m^g. *np*.

Σ 1358. IX^h 25^m·8, N. 45° 2′ : 7·3, 8·8 : 152°·6 : 24″·4. Fr., '15 : 7·7, 8·8 : 161°·8 : 23″·2. Fl., 7 m^g. *n*.

Σ 1359. IX^h 27^m·8, N. 56° 37′ : 8·5, 9·2 : 69°·5 : 7″·7.

θ (β 1071). IX^h 27^m·6, N. 52° 3′ : 3, 13·7 : 74°·9 : 5″·1., Lewis, '99 : 87°·1. Spec. Bin.

Σ 1350. IX^h 27^m·7, N. 67° 9′ : 7·2, 7·3 : 246°·3 : 10″·4. Distant 8 m^g.

Σ 1362. IX^h 30^m·5, N. 73° 26′ : 7, 7 : 137°·3 : 4″·9.

Σ 1376. IX^h 40^m·0, N. 43° 36′ : 8·2, 8·2 : 315°·8 : 5″.

υ (OΣ 521). IX^h 45^m·4, N. 59° 25′ : 4·2, 11·8 : 294°·4 : 11″ : pale y., o. c.p.m.

Σ 1381. ix^h 45^m·5, N. 61° 0′ : 8·5, 8·7 : 217°·6 : 1″·5.

ϕ (OΣ 208). ix^h 46^m·7, N. 54° 27′ : 5, 5·6 : 4°·4 : 0″·5. Bin. Per. 97 yrs. ? One revolution nearly completed. Bryant, '12 : 311° : 0″·4. Will remain at 0″·4 for some years. Angle increases.

Σ 1402. ix^h 59^m·6, N. 55° 54′ : 6·8, 8 : 96° : 21″·1. y., blsh. β, '02 : 100°·7 : 25″·6, from p.m.

Σ 1407. x^h 3^m·2, N. 64° 51′ : 9, 9·5 : 52°·5 : 4″·9.

Σ 1408. x^h 4^m·6, N. 73° 28′ : 8·4, 9·2 : 11°·8 : 3″·3.

Σ 1415. x^h 11^m·5, N. 71° 38′ : 6·1, 7 : 167°·1 : 16″·7 : v.w. Fr., '15 : yw., blsh. w.

Σ 1427. x^h 17^m·2, N. 44° 19′ : 7·2, 7·7 : 214°·1 : 9″·5.

Σ 1428. x^h 21^m·0, N. 53° 2′ : 7·5, 7·8 : 84°·3 : 3″·8.

β 1074. x^h 30^m·6, N. 46° 4′ : 6·4, 11·2 : 208°·4 : 2″·1.

Σ 1460. x^h 35^m·9, N. 42° 35′ : 8·1, 8·1 : 168°·7 : 3″·3.

Σ 1463. x^h 38^m·2, N. 47° 7′ : 8·5, 9 : 258°·3 : 7″·5.

Σ 1465. x^h 38^m·5, N. 45° 3′ : 8·5, 8·8 : 14°·4 : 2″·2.

Σ 1483. x^h 49^m·9, N. 47° 55′ : 8·7, 8·7 : 67°·2 : 3″·3.

Σ 1486. x^h 50^m·3, N. 52° 33′ : 7·5, 8·8 : 102°·8 : 28″·3 : y., o.

Σ 1495. x^h 55^m·0, N. 59° 20′ : 6, 8·3 : 38°·2 : 34″·5 : yw. Fr., '15 : pale y., bl.

α (β 1077). x^h 58^m·9, N. 62° 11′ : 2, 11·1 : 326°·1 : 0″·9. A., '99 : 276°·8 : 0″·6. '05, '11, not seen. Bin. Large star thought var. by h. Klein, col. var. A distant 8 m^g. violet.

51 (Ho. 377). xi^h 0^m·1, N. 38° 42′ : 6, 12·5 : 249°·5 : 8″·4.

Σ 1510. xi^h 3^m·4, N. 53° 15′ : 7·1, 8·4 : 341°·9 : 3″·9 : w., ashy.

Σ 1512. xi^h 4^m·4, N. 62° 56′ : 8, 8·5 : 50°·7 : 9″·4.

Ho. 254. xi^h 9^m·0, N. 33° 53′ : 6·5, 12 : 164°·7 : 2″·3.

Σ 1520. xi^h 11^m·5, N. 53° 12′ : 6·5, 7·8 : 345°·3 : 13″ : w., blsh. Fr., '15 : pale y., purple.

ξ (Σ 1523). xi^h 14^m·0, N. 32° 0′ : 4, 4·9 : 238°·7 : 1″·7, ’26. Earliest calculated Binary (by Savary, 1828), 60·8 yrs. Rapid c.p.m. Greatest dist. 3″, 1914, at 120° ±, closing to 0″·9 at 360° ±, 1933. Bowyer, ’12 : 118°·6 : 2″·9. Spec. Bin.

(Σ 1524). xi^h 14^m·2, N. 33° 32′ : 3·7, 10·1 : 146°·6 : 7″·1 : v.y., o. No *comes*, $3\frac{7}{10}$-in., ’52 ; seen by Wa., $2\frac{7}{8}$-in., ’74. De., 3·8, 9·6.

Σ 1525. xi^h 15^m·0, N. 47° 55′ : 9, 9 : 177°·7 : 2″·3.

Σ 1533. xi^h 17^m·8, N. 37° 32′ : 8·2, 8·4 : 172°·8 : 23″·1.

57 (Σ 1543). xi^h 24^m·8, N. 39° 47′ : 5·2, 8·2 : 10°·7 : 5″·4 : w., ash. Lewis, ’11 : 359°·7. W, ruddy ? *Comes*, 9 m^g., var. ? ’52. c.p.m.

OΣ 234. xi^h 26^m·5, N. 41° 43′ : 7, 7·4 : 177°·5 : 0″·4 : ’44. A., ’12 : 161°·4 : 0″·5. Bin. See, 77 yrs. Es., pair, 30^s *p*, 3′ *s* : 9·7, 9·8 : 302°·3 : 3″·1.

Σ 1544. xi^h 26^m·8, N. 60° 9′ : 7, 8 : 89°·5 : 12″·5.

OΣ 235. xi^h 27^m·9, N. 61° 32′ : 6, 7·3 : 43°·1 : 1″ : ’72. Bryant, ’11 : 251°·4 : 0″·4. Hu., per. 70 yrs. Now widening towards 0° ±, to 0″·7, 1930. Great. dist. 1″·1.

Σ 1555. xi^h 32^m·1, N. 28° 14′ : 6·4, 6·8 : 339°·4 : 1″·2. Bowyer, ’12 : 174°·7. 11 m^g. *comes,* Do., 147°·6 : 21″. Sa., beautiful plum col. Sm. says ‘It is situated in a very vacant space to the eye . . . but to the powerful reflectors now in use, is in a very ocean of nebulæ.’

Σ 1553. xi^h 32^m·3, N. 56° 35′ : 7·3, 7·8 : 171°·5 : 5″·3.

Σ 1559. xi^h 34^m·4, N. 64° 48′ : 6·7, 7·7 : 322°·7 : 2″·1 : w., ’31. 7·7, ashy, ’36. So Fr., ’77.

Σ 1561. xi^h 34^m·6, N. 45° 33′ : 5·9, 8 : 266° : 10″·5 : ysh. w., ash. Fr., ’15 : 257° : 10″. p.m. 0″·7. Prettily grouped. Fr., 8 m^g. *sf.*

Σ 1576. XI^{h} 48^{m}·8, N. 31° 17′ : 8·2, 8·5 : 242°·7 : 5″·2.

65 (Σ 1579). XI^{h} 51^{m}·0, N. 46° 56′ : 6, 8·3 : 36°·5 : 3″·7 : v.w., bl. A. divides 6 : 7·1, 9 : 2°·9 : 0″·3. A 6·5 : 113°·8 : 62″·9. 9^{m} 38^{s} *p*, 53′ *s*, is Σ 1570 : 8·3, 8·8 : 48°·8 : 10″·7.

OΣ 241. XI^{h} 52^{m}·2, N. 35° 54′ : 6·5, 8·4 : 119°·1 : 1″·4.

β 918. XI^{h} 52^{m}·7, N. 32° 39′ : 6·4, 12·7 : 234°·3 : 7″·3; with 3 faint neb. in low-powered field, *f*.

β 919. XI^{h} 55^{m}·2, N. 33° 37′ : 6·2, 11·7 : 14°·3 : 4″·6.

Σ 1600. XII^{h} 1^{m}·5, N. 52° 23′ : 7, 8 : 93°·2 : 7″·6.

Hu. 1136. XII^{h} 1^{m}·6, N. 63° 23′ : 6, 11·4 : 223°·2 : 1″·9.

Σ 1603. XII^{h} 4^{m}·2, N. 55° 55′ : 6·9, 7·3 : 80°·6 : 22″·4.

Σ 1608. XII^{h} 7^{m}·5, N. 53° 53′ : 7·5, 7·7 : 223°·9 : 10″·6 : yw. Es., '01 : 11″·9.

Σ 1630. XII^{h} 15^{m}·0, N. 56° 49′ : 8·3, 9 : 166°·8 : 2″·3.

Σ 1691. XII^{h} 51^{m}·6, N. 58° 36′ : 8·2, 9 : 276°·5 : 19″.

Σ 1695. XII^{h} 52^{m}·8, N. 54° 32′ : 6·3, 8·2 : 289°·1 : 3″·3 : w., ash.

78 (β 1082). XII^{h} 57^{m}·3, N. 56° 48′ : 6, 9·6 : 74°·6 : 1″·5. Doo., '02 : 93°·7.

ζ (Σ 1744). XIII^{h} 20^{m}·7, N. 55° 20′ : 2·1, 4·2 : 147°·6 : 14″·4 : grnsh. w. This fine pair, which is said to have been discovered by Riccioli, and again noticed, 1700, Sept. 7, by Gottfried Kirch, and his scientific wife, Maria Margareta, are probably travelling together through space, and in very slow orbital motion, it forms a noble group with Alcor,[1] 5 m^{g}. (five distant *comites*, Es.), 11½′ distant (the 'rider upon the horse'), and another star, 8 m^{g}., which, however, is said to have been seen without a telescope. ζ, or Mizar, and Alcor, form a pair to the naked eye, and thus become an excellent object for a beginner, as the telescopic increase of brightness and distance admits of direct comparison; but the inversion of the astronomical eye-piece must be borne in mind, or the identity will be perplexing. ζ was the first pair photographed by Bond, and with very encouraging success. Spec. Bin.

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[1] Brightening ? K. Certainly no longer the severe naked-eye test, which it used to be, even in the Arabian sky.

Σ 1770. XIII^{h} 34^{m}·5, N. 51° 8′: 6·4, 7·9: 121°: 1″·8: y., ash. Orange, ruddy, clearly divided, 144; $3\frac{7}{10}$-in. '52.

Σ 1795. XIII^{h} 56^{m}·0, N. 53° 29′: 7, 10·2: 3°·2: 7″·6. Well seen, $3\frac{7}{10}$-in. De., 7, 9·5. In string of stars reaching from ζ towards coarse group in Boötes.

Σ 1820. XIV^{h} 10^{m}·4, N. 55° 42′: 8·2, 8·5: 46°·7: 2″·4: ysh. Storey, '09: 80°·4: 2″·2.

STARS WITH REMARKABLE SPECTRA, AND VARIABLES.

X (var.). VIII^{h} 35^{m}·2, N. 50° 26′: 8·4 < 13: 251^{d}: Fleming.

ρ. VIII^{h} 55^{m}·4, N. 67° 58′: 5·1: III: Du.

Es.-Birm. 292. IX^{h} 15^{m}·8, N. 57° 2′: 5·8: III: Du.

W (var.). IX^{h} 38^{m}·1, N. 56° 22′: 7·9–8·6: Müller and Kemf.

U (var.). X^{h} 9^{m}·7, N. 60° 25′: 7–8·8: Irr.: Fleming.

μ. X^{h} 17^{m}·6, N. 41° 54′: 3·1: III: Du.

R (var.). X^{h} 39^{m}·0, N. 69° 12′: 7–13·5: 302^{d}·1: Pogson.

Es.-Birm. 319. X^{h} 39^{m}·5, N. 67° 50′: 6·2: RY.: Fearnley. IV. Du. Var., Wendell.

Wide Pair. X^{h} 47^{m}·8, N. 52° 55′: 6, 6·2: OR.: II, III, in a region rich in stars of types II and III. Es.

β. XI^{h} 57^{m}·0, N. 56° 49′: has red 8, (Ar. 9), III: var.? 31^{s} *p*, 4′ *n*. Es.

ST (var.). XI^{h} 23^{m}·2, N. 45° 37′: 8·2–9: Leavitt.

Z (var.). XI^{h} 52^{m}·4, N. 58° 11′: 7·2–8·7: Irr.: King.

73. XII^{h} 23^{m}·8, N. 56° 9′ : 5·9 : RY. : III : Du.
T (var.). XII^{h} 32^{m}·8, N. 59° 56′ : 6·4–13·1 : 257^{d}·2 : Bonn.
Y (var.). XII^{h} 36^{m}·8, N. 56° 17′ : 8–9 : III : Es.
S (var.). XII^{h} 40^{m}·5, N. 61° 32′ : 7·3–12·5 : 226^{d}·5 : Pogson.
83. XIII^{h} 37^{m}·7, N. 55° 5′ : 5·5. Seen by B., 1868, Aug. 6 = δ, subsequently fading. Fine Or. III. D'A.

NEBULÆ.

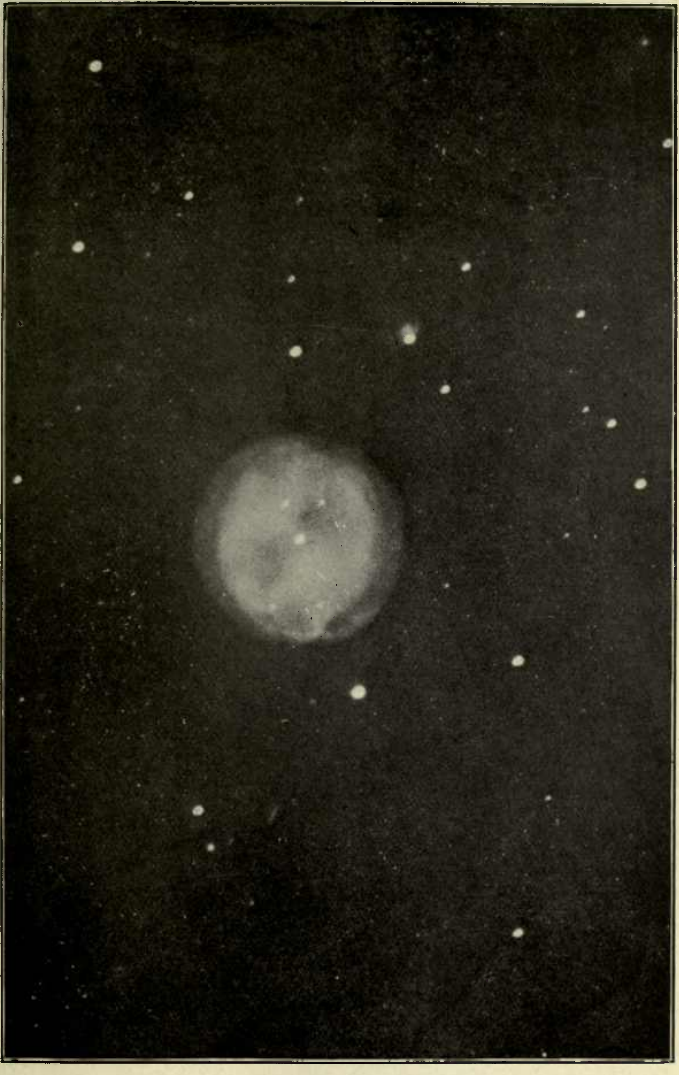
2841 (H. I 205). IX^{h} 16^{m}·5, N. 51° 19′. Large, oval, bright, with nucleus. D'A., *illustris*, *prægrandis*. E. of Rosse, like Androm. Neb. Dull object, $3\frac{7}{10}$-in., in fine field with 37, 6 m^{g}., $1\frac{1}{2}$° *sp* θ. Several pretty little pairs in neighbourhood. L.P., spiral.

2985 (H. I 78). IX^{h} 43^{m}·2, N. 72° 39′ : bright. D'A., resolvable ?

3031, 3034 (M. 81, 82). IX^{h} 49^{m}·0, N. 69° 26′. Two neb. $\frac{1}{2}$° apart ; 81 bright, with vivid nucleus, finely grouped with small stars, two of which are projected upon the haze, to which h. gives nearly 15′ of length. Two little pairs *sp*, making the field very interesting. The nearer is Σ 1387 : 9·5, 9·5 : 269°·6 : 8″·9 ; the further is Σ 1386 : 8·2, 8·2 : 296° : 2″. 82 (Bode's neb.), curious narrow curved ray. D'A., 7′ × 100″, two nuclei, and sparkling as if resolvable, which 81 is not. Huggins finds both spectra continuous, but deficient at the red end, like the Androm. neb., etc. L.P., spiral ; spect. one absorption and two bright lines.

3556 (H. V 46). XI^{h} 6^{m}·8, N. 56° 6′. Large, faint, well-defined, elongated, rather curved : small star in centre. 1° *sf* β. L.P., probably spiral.

3587 (M. 97). XI^{h} 10^{m}·0, N. 55° 27′. Large pale plan. neb. ; very remarkable object. h., 2′ 40″, which at distance of 61 Cygni only, would equal 7 times orbit of Neptune.



THE OWL NEBULA, M. 97, URSÆ MAJORIS.

Photographed at the Lick Observatory.

He saw light nearly equable, though with softened edge, and faintly bicentral. E. of Rosse, on the contrary, two large perforations (whence it has been called the 'Owl Neb.'), and an indistinct spiral structure. Before 1850 there was a star in each opening; since, one only. Huggins, gas-spectrum; 2° *sf* β. L.P. shows an outer ring. Barnard three faint stars, the central one variable. Mt. Wilson 5 stars. 100 small neb. in field.

3610 (H. I 270). xi$^{\text{h}}$ 13$^{\text{m}}$·8, N. 59° 17′. Bright, not large. D'A., haze round star-like nucleus.

3613 (H. I 271). xi$^{\text{h}}$ 14$^{\text{m}}$·0, N. 58° 26′. Elongated; nucleus.

3675 (H. I 194). xi$^{\text{h}}$ 21$^{\text{m}}$·8, N. 44° 2′. Large, elongated; star-dust *p*.

3941 (H. I 173). xi$^{\text{h}}$ 48$^{\text{m}}$·8, N. 37° 26′. Large in dark nights; central blaze.

4026 (H. I 223). xi$^{\text{h}}$ 55$^{\text{m}}$·3, N. 51° 24′. D'A., unusual phenomenon; very unlike other neb. of the region. Star 10 m$^{\text{g}}$. in centre of slender sharp-pointed ray, 4′ × 20″.

4258 (H. V 43). xii$^{\text{h}}$ 15$^{\text{m}}$·0, N. 47° 45′. Large, oval, bright, best defined at sides; nucleus *s*, like Androm. neb. on small scale. D'A., 10′ × 2½′. Spectrum continuous. L.P., spiral.

5322 (H. I 256). xiii$^{\text{h}}$ 46$^{\text{m}}$·6, N. 60° 35′. Bright; nucleus.

URSA MINOR.

This constellation is distinguished by a still more inappropriate length of tail than its larger neighbour, by which, as Sm. observes, it is swung round every twenty-four hours. At its extremity stands the most valuable star in the heavens, Polaris, 1° 7′ from the polar point, which, from the precession of the equinoxes, it will approach as near as 26′ 30″, its nearest, A.D. 2095.

DOUBLE STARS.

α (Σ 93). I^{h} 31^{m}·7, N. 88° 53′ : 2, 9 : 210°·1 : 18″·3 : y., w. Fr., '14 : 216°·1. Spec. Bin., and slightly var. D., 9 blsh. as I see it. Common test, but only suited for small apertures, being easy with anything much exceeding 2 in. D. has proposed it as a general standard, finding that 80 on 2-in. will show it if the eye and telescope are good; he has glimpsed it with 1$\frac{3}{10}$-in. achr. Dawson has glimpsed it with 1-in. T. T. Smith sees it with 1$\frac{1}{4}$-in. refl. In Dorpat achr. it has been perceived by day. De. gives it 8·4 m^{g}. β, *comes*, 15 : 83°·3 : 44″·7.

Σ 1583. XI^{h} 55^{m}·9, N. 87° 26′ : 7·5, 8·5 : 282°·8 : 11″·1.

β 799. XIII^{h} 2^{m}·4, N. 73° 27′ : 6·5, 8·5 : 238°·7 : 0″·6 : '81. Doo., '01 : 248°·1. Bin.

OΣ 262. XIII^{h} 8^{m}·0, N. 74° 24′ : 7·3, 8·2 : 182°·5 : 28″ : w., reddish.

Σ 1761. XIII^{h} 30^{m}·0, N. 72° 8′ : 8·5, 9 : 72° : 20″·1.

Σ 1771. XIII^{h} 34^{m}·6, N. 70° 11′ : 7·8, 8·5 : 70°·6 : 1″·7.

Σ 1798. XIII^{h} 55^{m}·1, N. 78° 47′ : 7·5, 9·3 : 16°·3 : 7″·1.

Σ 1849. XIV^{h} 20^{m}·0, N. 77° 4′ : 8·5, 9 : 1°·2 : 1″·5.

Hu. 908. XIV^{h} 54^{m}·6, N. 78° 30′ : 6·5, 10 : 266°·4 : 1″·2.

Σ 1905. XIV^{h} 56^{m}·2, N. 71° 9′ : 8·3, 8·3 : 160°·1 : 3″·8.

Σ 1928. XV^{h} 9^{m}·4, N. 72° 45′ : 8·5, 9·2 : 227°·6 : 6″·6.

Σ 3125. XV^{h} 24^{m}·6, N. 67° 21′ : 8·7, 9 : 272°·3 : 2″·2.

π^{1} (Σ 1972). XV^{h} 33^{m}·8, N. 80° 43′ : 6·1, 7 : 83° : 30″·1 : ysh. Fr., '15, yw., blsh. w. Easily found *np* ζ.

Σ 1980. XV^{h} 37^{m}·6, N. 81° 19′ : 8·5, 9 : 53°·9 : 10″.

π^{2} (Σ 1989). XV^{h} 44^{m}·0, N. 80° 14′ : 7·1, 8·1 : 24°·1 : 0″·7.

A., '06 : 111°·1 : 0″·1. Bin. 115 yrs. ? in elongated orbit. Now widening with decreasing angle.

Σ 2034. xv^{h} 58^{m}·4, N. 83° 51′ : 7·5, 8 : 115° : 1″·4 : ysh.
Σ 2066. xvi^{h} 24^{m}·1, N. 76° 31′ : 9, 9 : 58°·4 : 5″.
Hu. 917. xvi^{h} 46^{m}·8, N. 77° 37′ : 6, 12 : 191°·9 : 3″.
Σ 2179. xvii^{h} 21^{m}·5, N. 72° 40′ : 8·2, 8·8 : 213°·3 : 5″·5.
OΣ 340. xvii^{h} 32^{m}·5, N. 86° 57′ : 7·8, 8·3 : 237°·2 : 31″·5. Fr., '14 : 229°·3.

STAR WITH REMARKABLE SPECTRUM, AND VARIABLES.

Es.-Birm. 399. xiv^{h} 10^{m}·6, N. 69° 49′ : 5·3 : III : Du.
S (var.). xv^{h} 32^{m}·6, N. 78° 54′ : 7·5–11 : 324^{d} : Fleming.
R (var.). xvi^{h} 31^{m}·0, N. 72° 25′ : 9·2–10·6 : Irreg. : Pickering.

VIRGO.

A constellation especially remarkable for those possessed of adequate optical means, on account of the wonderful *nebulous region*, in which a far greater number of these extraordinary bodies are accumulated than in any other equal area of the heavens, H. having detected within its boundaries no less than 323. Few of them, however, are individually interesting; it is the mysterious thronging together of these objects, whatever may be their nature, that opens such a field for curiosity. They are in general so much alike that I have only adduced a few as specimens. They are profusely scattered over this quarter of the sky; but the region more especially referred to is pretty well defined to the naked eye by the stars ε, δ, γ, η and β Virg. and β Leonis.

Spica, the leader, was found by Vogel to be a spec. Bin. Per., 4 days.

DOUBLE STARS.

Σ 1560. XI^h 34^m·3, S. 1° 59′ : 6, 10·2 : 280°·6 : 5″·1 : v.y., o : *comes* glimpsed ? $3\frac{7}{10}$-in. Sa., bl. De., 6·2, 9·7.

Σ 1568. XI^h 39^m·2, N. 1° 13′ : 8·9, 9·1 : 221°·3 : 9″. Vars. ? De., 9·7, 9·8.

h. 1201. XI^h 46^m·6, N. 12° 41′ : β, 6·3, 11·5 : 190°·1 : 15″.

Σ 1575. XI^h 47^m·9, N. 9° 17′ : 7, 8 : 209°·8 : 30″·6.

Σ 1580. XI^h 51^m·4, N. 4° 0′ : 8, 9 : 261° : 8″·8.

Σ 1591. XI^h 57^m·4, N. 0° 4′ : 8, 8 : 353°·8 : 53″·8. β, '05 : 52″·6. 12 m^g., β, 52°·6 : 23″·9.

Σ 1593. XI^h 59^m·4, S. 2° 0′ : 8·3, 8·3 : 18°·2 : 1″·4.

Σ 1604. XII^h 5^m·3, S. 11° 24′ : 6·5, 9 : 93°·3 : 12″. β, '05 : 90°·7 : 10″·6. A 7·8 : 96°·9 : 58″. '31. β, 89°·9 : 35″·1. p.m.

Σ 1605. XII^h 6^m·4, S. 1° 47′ : 8, 8·5 : 278°·4 : 23″·5.

Σ 1618. XII^h 11^m·0, N. 10° 27′ : 8·5, 8·5 : 244°·7 : 25″·8.

Σ 1619. XII^h 11^m·1, S. 6° 48′ : 7·5, 7·8 : 287°·6 : 7″·8. Bowyer, '12 : 277°·9 : 7″·4. r.m.

Σ 1627. XII^h 14^m·1, S. 3° 30′ : 5·9, 6·4 : 196°·3 : 20″·1. H., equal 1785, 1786. *nf.* decidedly the largest, '51. Fr., 0·5 m^g. diff. '77. De., 6, 6·6.

Σ 1628. XII^h 14^m·6, N. 12° 15′ : 8·5, 8·7 : 239°·3 : 9″·3.

Σ 1635. XII^h 17^m·0, S. 11° 1′ : 7·7, 8·7 : 173°·5 : 13″·4.

17 (Σ 1636). XII^h 18^m·5, N. 5° 45′ : 6·2, 9 : 336°·7 : 19″·3 : grnsh. w., o. Ball, rose, blsh., '51. Bird., w., bl. De., 6, 8·9 : y., purple. Fr., yw., blsh., '15. Σ, c.p.m. Sa., 2 neb. *f*, a little *s* ; brighter, G.C. 4324.

Σ 1647. XII^h 26^m·5, N. 10° 10′ : 7·5, 7·8 : 202° : 1″·2. Greenw., '12 : 224°·2 : 1″·4.

Σ 1649. XII^h 27^m·5, S. 10° 39′ : 7·2, 8 : 194°·1 : 15″·2.

Σ 1659. xii^h 31^m·6, S. 11° 36′ : 8, 8·1 : 351°·9 : 27″·1, an 11 m^g. : 68°·9 : 30″·9, being left behind, now 36″·4. De. notices that this triangularly arranged triple is within a large triangle, 7, 7·2, 9·5.

Σ 1661. xii^h 32^m·0, N. 11° 51′ : 8·5, 8·5 : 226° : 2″·6. Furner, '12 : 241°·5.

Σ 1665. xii^h 34^m·6, S. 4° 53′ : 8·5, 9 : 97° : 8″·8.

Σ 1668. xii^h 36^m·9, N. 9° 16′ : 7·5, 9 : 196°·9: 1″·7.

γ (Σ 1670). xii^h 37^m·7, S. 1° 0′ : 3, 3 : 277°·9 : 2″·4 : ysh. '25. This wonderful pair has been widening ever since they closed up out of all telescopic reach in 1836 (except at Dorpat, where 848 still showed elongation, 151°·6 : 0″·3) and a very moderate instrument will now suffice for them. Now at nearly greatest distance. Ph., '14 : 325°·4 : 6″. β, period 193·7 years. Lewis, 182 years. Ha., greatest dist. 6″·3, least 0″·5. Σ thought them alternately var., with possible period of at least several yrs. Humboldt suggested slow axial rotation in each. β, *comes*, 14·5 : 159°·4 : 53″·1, and pair in field (β 607), 3^s *p* : 8·5, 11 : 315°·8 : 1″·2. Fixed.

31 (β 924). xii^h 37^m·9, N. 7° 15′ : 5, 11·5 : 29° : 3″·9.

Σ 1677. xii^h 41^m·2, S. 3° 27′ : 7, 8 : 348°·4 : 15″·9.

Σ 1681. xii^h 45^m·5, N. 4° 15′ : 8·5, 8·5 : 193°·5 : 8″·5.

Σ 1682. xii^h 47^m·2, S. 9° 54′ : 6·7, 9 : 308°·8 : 33″·7 : y., o. Topaz, blsh., or purp., '51. Hu., '04 : 304°·5 : 31″·7.

Σ 1686. xii^h 49^m·0, N. 15° 28′ : 8, 8·2 : 187°·6 : 5″·4.

Σ 1689. xii^h 51^m·5, N. 11° 56′ : 6·7, 9 : 198°·4 : 28″·7 : ysh., blsh. Fr., '15 : 209°·4 : pale or., bl.

Σ 1690. xii^h 52^m·1, S. 4° 26′ : 7·4, 8·9 : 149°·8 : 5″·9.

44 (Σ 1704). xii^h 55^m·5, S. 3° 23′ : 6, 11·2 : 53° : 21″·3.

46 (A.G.C. 5). xii^h 56^m·5, S. 2° 56′ : De., 5·3, 8·1 : 149°·5 : 1″·2 : y., ash., or olive. *β, comes* : 116°·9 : 33″·9.

β 341. xii^h 59^m·5, S. 20° 9′ : 6·2, 6·7 : 136°·2 : 0″·8.

48 (*β* 929). xii^h 59^m·8, S. 3° 14′ : 6·2, 6·2 : 229°·4 : 0″·5 : '79. Greenw., '12 : 215°·4.

Σ 1712. xii^h 59^m·8, N. 9° 53′ : 9, 9·4 : 336°·6 : 8″·6.

Σ 1719. xiii^h 3^m·3, N. 1° 1′ : 7·3, 7·8 : 3°·1 : 7″·2. Fr., '16 : 0°·2.

θ (*Σ* 1724). xiii^h 5^m·8, S. 5° 7′ : 4, 9 : 344° : 7″·1 : w., o. *Comes* grnsh., or blsh., '56. h. and South called 9 a very severe test for 5-ft. telescope, '24. Glimpsed by Wa., 2¼-in. '75. Another *comes*, De., 10 : 297°·6 : 70″·5. Fr., '16 : 299°·2 : 72″·4. Gore, both well seen, 3-in.

β 931. xiii^h 6^m·8, N. 13° 44′ : 6·7, 11·8 : 204°·9 : 4″·9.

54 (H*h*. 412). xiii^h 9^m·2, S. 18° 24′. Cincinnati, 7, 7·2 : 33°·8 : 5″·1. To me pale y. ? pale bl., '52. Sa., ysh., rdsh., '76. Fr., y., bl., contrast, '77. Sa., 11 m^g. *sp*. *β*, pair 1^m 46^s *f*, 6′ *s* : 8, 8·6 : 36°·3 : 3″·9.

σ 434. xiii^h 10^m·7, S. 10° 56′ : *β*, 7, 8 : 52°·5 : 64″·6 : '81, 71″·2, '02, from p.m. in 7 (0″·4 annually). Fr., w., bl., '77. Other stars in group.

Σ 1734. xiii^h 16^m·6, N. 3° 21′ : 7·2, 7·9 : 198°·1 : 0″·7. Chapman, '12 : 186°·2 : 1″·3.

Σ 1738. xiii^h 19^m·6, S. 14° 30′ : 8·2, 8·3 : 283°·5 : 4″·1.

β 610. xiii^h 19^m·6, S. 20° 31′ : 6·8, 10·5 : 18°·3 : 4″.

Σ 1740. xiii^h 19^m·6, N. 3° 7′ : 7·1, 7·2 : 76°·3 : 27″·3.

Σ 1742. xiii^h 20^m·2, N. 1° 49′ : 7·4, 7·9 : 351°·1 : 1″·3.

β 114. xiii^h 30^m·1, S. 8° 12′ : 7·6, 8 : De., 137°·1 : 1″·5.

Σ 1757. xiii^h 30^m·2, N. 0° 6′ : 7·8, 8·9 : 21° : 1″·5. Elong. ? '51. A., '06 : 79°·9 : 2″·5. Bin. Morton, *comes*, 11·5, est. 160° : 40″. Doo., '07 : 153°·2 : 42″·2.

β 932. xiii^h 30^m·4, S. 12° 48′ : 6·1, 6·6 : 81°·2 : 0″·5;

comes, 12·4 : 153°·6 : 25″·1. Believed by Schm., '66, var. 5–8, but mentioned by Persian astronomer, Sûfi, 10 cent. Gould also found var., Sawyer none. Rejected by Chandler.

81 (Σ 1763). XIII^h 33^m·4, S. 7° 28′ : 7·5, 7·5 : 39° : 2″·7. Sa., minute bl. *comes*, *np*.

Σ 1764. XIII^h 33^m·7, N. 2° 48′ : 7, 8·7 : 31°·7 : 16″ : y., ash.

Σ 1773. XIII^h 37^m·6, N. 8° 1′ : 9, 9, 9·5 : 209°·8, 102°·4 : 27″·9, 57″·1.

84 (Σ 1777). XIII^h 39^m·1, N. 3° 57′ : 5·8, 8·2 : 235°·4 : 3″·4 : y., v. bl. Difficult, $3\frac{7}{10}$-in. Wa., $2\frac{7}{8}$-in., '74. Ph., '13 : 230°·8.

Σ 1775. XIII^h 39^m·3, S. 3° 52′ : 7, 9·7 : 335°·7 : 27″·7 : ysh., o. 9·7 seen, much out of focus with strong moon, '52. Fr., 9·5, '77. De., 6·5, 10.

86 (Σ 1780 rej.). XIII^h 41^m·7, S. 12° 1′ : β, 5·8, 10·5 : 164°·6 : 27″·2. β, doubles each (β 935), 5·8, 10 : 299°·6 : 1″·7 and 10·5, 11·2 : 275°·9 : 2″·2.

Σ 1781. XIII^h 42^m·1, N. 5° 31′ : 7·8, 8·2 : 240°·4 : 1″·4 : yw. Ph., '14 : 283°·0 : 0″·9.

Σ 1788. XIII^h 50^m·8, S. 7° 40′ : 6·7, 7·9 : 54° : 2″·4. Doo., '05 : 77°·4 : 2″·8. Clearly divided, '80. Heis, 6 m^g.

Σ 1790. XIII^h 51^m·9, S. 4° 14′ : 8·6, 8·7 : 240°·8 : 5″·3.

τ (H*h*. 432). XIII^h 57^m·6, N. 1° 56′ : South, 4, 9 : 290° : 79″·3.

Σ 1799. XIV^h 0^m·6, S. 6° 11′ : 8, 9·2 : 283° : 4″ : w., blsh.

Σ 1805. XIV^h 5^m·9, N 4° 24′ : 8·4, 8·5 : 30°·5 : 4″·6.

Σ 1807. XIV^h 7^m·2, S. 2° 57′ : 7·8, 8 : (28°·5) : 7″·1.

Σ 1819. XIV^h 11^m·3, N. 3° 30′ : 7·9, 8 : 84°·9 : 1″ : ysh. Alcocks, '14 : 344°·8 : 1″·2.

β 116. XIV^h 15^m·2, S. 13° 20′ : 7·7, 8·2 : 277°·4 : 3″.

β 225. XIV^h 21^m·0, S. 19° 37′ : De., 6, with double *comes* (7·3, 8·2 : 101°·9 : 1″·4) at 295°·5 : 35″.

Σ 1842. xiv^{h} 23^{m}·0, N. 4° 3′ : 8·7, 8·7 : (14°·8) : 2″·8.
ϕ (Σ 1846). xiv^{h} 24^{m}·1, S. 1° 52′ : 5·2, 9·7 : 108°·8 : 3″·7 : y., o. Hu., '04 : 110°·5 : 4″·7. *Comes* not seen, '54. Wa., 2$\frac{7}{8}$-in. '74. De., 9·4.
Σ 1869. xiv^{h} 38^{m}·5, S. 5° 37′ : 8, 9 : 132°·6 : 26″.
Σ 1881. xiv^{h} 43^{m}·0, N. 1° 19′ : 7, 9·3 : 357°·9 : 3″·6 : v.w., ash.
β 1113. xiv^{h} 43^{m}·4, N. 2° 5′ : 6·2, 11·8 : 137°·1 : 4″·5.
Σ 1904. xv^{h} 0^{m}·1, N. 5° 48′ : 346°·4 : 9″·6.

Stars with Remarkable Spectra, and Variables.

ω. xi^{h} 34^{m}·3, N. 8° 35′ : 6·1 : III. D'A.
ν. xi^{h} 41^{m}·7, N. 6° 59′ : 4·3 : III. D'A.
Es.-Birm. 337. xi^{h} 54^{m}·1, N. 3° 56′ : 7·5 : R. Webb. III.
X (var.). xi^{h} 56^{m}·7, N. 9° 38′ : 8 ?–12 : Peters.
RX (var.). xii^{h} 0^{m}·7, S. 5° 20′ : 7·2–8·8 : Irr. Fleming.
RW (var.). xii^{h} 3^{m}·1, S. 6° 19′ : 7·1–8·3 : Irr. Fleming.
T (var.). xii^{h} 10^{m}·5, S. 5° 35′ : 8·7–13·5 : 339^{d}·5. Boguslawski.
SS (var.). xii^{h} 21^{m}·1, N. 1° 13′ : 7·8 : Irr. B. IV. Wolf finds var. 4 m^{gs}. photographically. Wendell, visually, 0·5 m^{g}.
Es.-Birm. 352. xii^{h} 26^{m}·3, N. 4° 51′ : 8·5 : Rosse. III.
Y (var.). xii^{h} 29^{m}·8, S. 3° 59′ : 8·6–14·5 : 218^{d}·8 : Henry.
R (var.). xii^{h} 34^{m}·4, N. 7° 26′ : 6·4–12·1 : 145^{d}·4 : Harding.
RU (var.). xii^{h} 43^{m}·2, N. 4° 35′ : 8–12 : 440^{d} : Roy.
35. xii^{h} 43^{m}·8, N. 4° 0′ : 6·7 : III : Vogel.
U (var.). xii^{h} 47^{m}·1, N. 5° 59′ : 7·5–13·5 : 206^{d}·9 : Harding.
ψ. xii^{h} 50^{m}·2, S. 9° 6′ : 5·2 : III : D'A.
δ. xii^{h} 51^{m}·6, N. 3° 50′ : 3 : III : '*Bellissima*.' Se.
RT (var.). xii^{h} 58^{m}·6, N. 5° 37′ : 8–9 : Irr. : Fleming, another var., 10·3–11·5, 12^{s} *p*.
Var. xiii^{h} 9^{m}·9, S. 2° 22′ : 7·4–8·8 : Irr. : Fleming.

σ. XIII^{h} 13^{m}·6, N. 5° 53′ : 5·2 : III : Vogel.
W (var.). XIII^{h} 21^{m}·9, S. 2° 58′ : 8·7–10·4 : 17^{d}·2 : Schönfeld.
V (var.). XIII^{h} 23^{m}·7, S. 2° 45′ : 8–14 : 250^{d}·5 : Goldschmidt.
74. XIII^{h} 27^{m}·8, S. 5° 40′ : 5·1 : III : Vogel.
S (var.). XIII^{h} 28^{m}·8, S. 6° 47′ : 5·6–12·3 : 376^{d}·9 : Hind.
RR (var.). XIV^{h} 0^{m}·6, S. 8° 49′ : 11–15 : 217^{d} : Peters.
Z (var.). XIV^{h} 6^{m}·0, S. 12° 56′ : 9–15 : 307^{d}·5 : Palisa.
RS (var.). XIV^{h} 23^{m}·3, N. 5° 2′ : 8·1–12·3 : 355^{d} : Fleming.

NEBULÆ.

4192 (M. 98). XII^{h} 9^{m}·7, N. 15° 21′. Long ray. h., 10′; D'A., nucleus.

4216 (H. I 35). XII^{h} 12^{m}·8, N. 13° 36′. Long, shuttle-like nucleus. E. of Rosse, 15′.

4254 (M. 99). XII^{h} 14^{m}·8, N. 14° 52′. E. of Rosse, wonderful spiral. Key, resolvable, 18-in. 'With' spec. So D'A.

4303 (M. 61). XII^{h} 17^{m}·8, N. 4° 55′. Faint; bright centre, E. of Rosse, spiral.

4406 (M. 86). XII^{h} 22^{m}·1, N 13° 23′. h., very bright, resolvable? *nf*, G.C. 4435, 4438. In this neighbourhood Lowe sees 7 nebulæ in large field with fine 15½-in. Calver.

4472 (M. 49). XII^{h} 25^{m}·7, N. 8° 27′. Bright; D'A., *illustris*, *grandis*, and resolved. Faint haze in beautiful position between two 6 m^{g}. stars. Bright open pair *s*, $3\frac{7}{10}$-in.

4501 (M. 88). XII^{h} 28^{m}·0, N. 14° 52′. Long, pale; D'A., 7′×1½′; nucl. In wonderful nebulous region. h., ray 8′×1′. E. of Rosse, spiral? Marvellous region as swept with 64; identification difficult.

4526 (H. I 31). XII^{h} 30^{m}·0, N. 8° 8′. h., very bright.

4594 (H. I 43). XII^{h} 35^{m}·8, S. 11° 11′. Long, h., 5′×30″, nucl. and dark cleft. Beautiful low-powered field: fine and singular 7 m^{g}. group *np*.

4649 (M. 60). XII^{h} 39^{m}·6, N. 11° 59′. Double; *p* extremely faint. Not seen $3\frac{7}{10}$-in. In large field with M. 59 *np*, and H. II 70 *sp*, like a hazy star.

4697 (H. I 39). XII^{h} 44^{m}·5, S. 5° 22′. h., very bright.

4699 (H. I 129). XII^{h} 44^{m}·9, S. 8° 14′. h., very bright.

4754, 4762 (H. II 74, 75). XII^{h} 48^{m}·3, N. 11° 45′. In one field. 4762 like a paper kite ; beautifully grouped with 3 stars. D'A. and E. of Rosse, long bright ray, nucl.

5634 (H. I 70). XIV^{h} 25^{m}·4, S. 5° 37′. Small. h., resolved, stars 19 m^{g}. D'A., beautiful, bl. with Red star (Es.-Birm. 404), 8 m^{g}. (var. ? Es.) *sf.* Prettily grouped.

5846 (H. I 128). XV^{h} 2^{m}·4, N. 1° 55′. h., very bright.

VULPECULA AND ANSER.

Two little modern asterisms, arranged by Hevel. Grand sweeping ; few coloured stars.

Double Stars.

Σ 2445. XIX^{h} 1^{m}·3, N. 23° 12′ : 6·3, 8 : 263°·5 : 12″·1 : v.w., ashy.

Σ 2455. XIX^{h} 3^{m}·5, N. 22° 2′ : 7·3, 8·3 : 144°·5 : 4″·9. Bowyer, '12 : 71°·8 : 3″·6. r.m.

Σ 2457. XIX^{h} 3^{m}·7, N. 22° 28′ : 7·2, 8·7 : 201°·3 : 10″·1.

2 (*β* 248). XIX^{h} 14^{m}·3, N. 22° 53′ : 5·8, 9·6 : 127°·7 : 2″.

Σ 2499. XIX^{h} 15^{m}·1, N. 21° 48′ : 8·1, 8·4 : 329°·4 : 2″·6.

O*ΣΣ* 181. XIX^{h} 16^{m}·9, N. 26° 30′ : De., 6·2, 6·3 : 5° : 54″·6 : Ry., azure. Es., lovely. Fr., '13 : 3°·3 : 56″·4.

Σ 2504. XIX^{h} 17^{m}·5, N. 18° 59′ : 6·4, 8·1 : 288°·3 : 8″·9 : yw., blsh. Fr., '15 : 284°·8.

Σ 2515. XIX^{h} 21^{m}·1, N. 21° 22′ : 8, 9 : 18°·3 : 18″·7. *β*, '05 : 29°·6 : 9″·8. r.m.

Σ 3111. XIX^{h} 21^{m}·7, N. 21° 41′ : 9, 9·3 : 120°·1 : 2″·5.

Σ 2523. xix^h 23^m·3, N. 21° 0′ : 7·3, 7·4 : 151°·5 : 6″·2.

6, 8. xix^h 25^m·4, N. 24° 30′ : 4, 5 : deep and pale y., in beautiful field 3° nearly *s* from *β* Cygni. Separating. Doo., pair, 1^m 29^s *f*, 30′ *n*, 10, 11 : 322° : 0″·9.

Σ 2540. xix^h 29^m·8, N. 20° 14′ : 7·5, 9 : 149°·7 : 5″·1 : w., blsh.

9 (*β* 1130). xix^h 31^m·0, N. 19° 36′ : 5·5, 14 : 31°·3 : 9″·5. Situated in a remarkable little asterism, as seen with an opera glass ; six stars in a line.

Σ 2548. xix^h 33^m·1, N. 24° 49′ : 8, 9 : 100°·8 : 9″·3.

β 658. xix^h 40^m·6, N. 26° 57′ : 6·5, 10 : 295°·2 : 0″·6.

Σ 2584. xix^h 44^m·9, N. 22° 0′ : 8·5, 8·5 : 299°·2 : 1″·9.

OΣ 388. xix^h 49^m·0, N. 25° 39′ : 7·6, 7·6 : 140°·5 : 3″·7. Triple, 8·8 : 139°·1 : 26″·6.

Σ I 48. xix^h 49^m·8, N. 20° 7′ : 6·7, 6·8 : 147°·9 : 42″·2. Another pair (Σ 2595 rej.) *p*, followed by a minute star (5½-in.), makes up a pretty group.

Ho. 584. xix^h 58^m·0, N. 25° 58′ : 6·5, 12 : 226°·4 : 2″·3.

16 (OΣ 395). xix^h 58^m·6, N. 24 °43′ : 5·8, 6·2 : 71°·3 : 0″·6. Bryant, '12 : 104°·4 : 0″·6.

Σ 2631. xx^h 3^m·7, N. 20° 52′ : 8, 9·4 : 342°·1 : 4″·4 : ysh., o. Rsh.

Σ 2655. xx^h 10^m·6, N. 21° 59′ : 7·5, 7·5 : 3° : 6″·1.

β 983. xx^h 11^m·9, N. 25° 21′ : 6·1, 10·2 : 154°·9 : 0″·9.

Σ 2692. xx^h 27^m·6, N. 26° 13′ : 8, 9 : 303° : 25″·7. *Comes*, 12·5 : 157° : 10″.

Σ 2695. xx^h 28^m·5, N. 25° 32′ : 6·2, 8 : 76°·5 : 0″·8.

Σ 2698. xx^h 30^m·4, N. 27° 56′ : 8·1, 9 : 305°·6 : 4″·1.

Σ 2724. xx^h 40^m·9, N. 23° 39′ : 8·2, 8·3 : 325°·7 : 2″·5.

Σ 2761. xxi^h 3^m·9, N. 24° 5′ : 8·7, 9·2 : 112°·2 : 5″·4.

Σ 2769. xxi^h 6^m·9, N. 22° 8′ : 6·5, 7·5 : 300°·9 : 17″·8 : w., '30 : 7·5, 9-in. spec. '73 ; so Fr., '76.

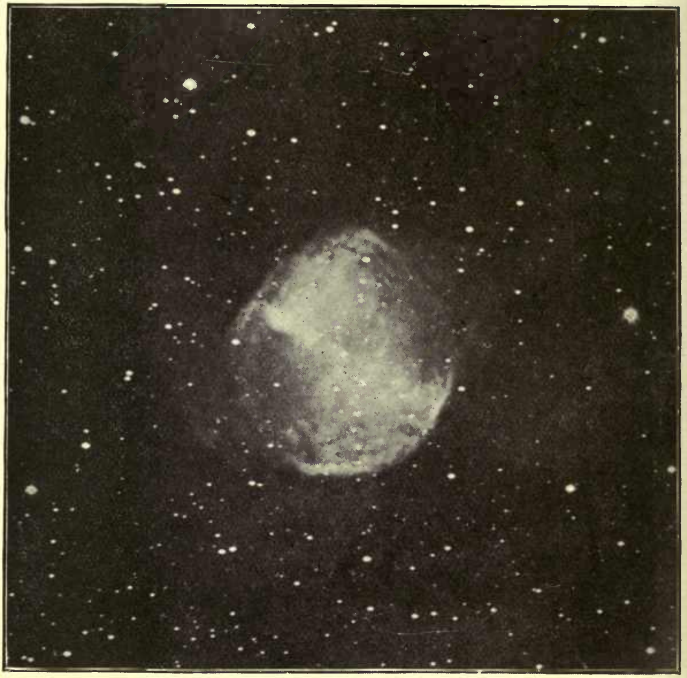
β 447. xxi^h 20^m·5, N. 24° 58′ : 6·2, 12·7 : 330°·4 : 8″·5.

STARS WITH REMARKABLE SPECTRA, AND VARIABLES.

Es.-Birm. 586. xix$^{\text{h}}$ 1$^{\text{m}}$·4, N. 23° 12′ : 8·7 : pale R. Webb.
Es.-Birm. 589. xix$^{\text{h}}$ 5$^{\text{m}}$·3, N. 24° 3′ : 7 : R. Con. des Temps. III. Var. ?
RS (var.). xix$^{\text{h}}$ 14$^{\text{m}}$·2, N. 22° 18′ : 7·5–? : 4$^{\text{d}}$·5 : Algol type. Astbury.
Es.-Birm. 597. xix$^{\text{h}}$ 16$^{\text{m}}$·1, N. 22° 25′ : 7·7 : R. Webb.
11. xix$^{\text{h}}$ 44$^{\text{m}}$·3, N. 27° 7′. Anthelm's Nova, 3rd m$^{\text{g}}$. disappearing after two years, and not seen since.
Es.-Birm. 624. xix$^{\text{h}}$ 44$^{\text{m}}$·8, N. 22° 34′ : 7·7 : Or. : W.
S (var.). xix$^{\text{h}}$ 45$^{\text{m}}$·1, N. 27° 5′ : 8·4–10 : 67$^{\text{d}}$·5 : Baxendell.
Es.-Birm. 677. xx$^{\text{h}}$ 31$^{\text{m}}$·2, N. 28° 2′. E. of Rosse, R. star in cl. Es. var. ? 8·7–9·3 : III, another, 9·5, R. *sp.*
U (var.). xx$^{\text{h}}$ 33$^{\text{m}}$·2, N. 20° 11′ : 6·5–7·6 : 7$^{\text{d}}$·9 : Müller and Kemf.
Es.-Birm. 690. xx$^{\text{h}}$ 45$^{\text{m}}$·3, N. 22° 42′ : 8 : III : D'A.
T (var.). xx$^{\text{h}}$ 48$^{\text{m}}$·1, N. 27° 57′ : 5·5–6·1 : 4$^{\text{d}}$·4 : Sawyer.
R (var.). xxi$^{\text{h}}$ 0$^{\text{m}}$·8, N. 23° 30′ : 7·5–12·1 : 136$^{\text{d}}$·8 : Bonn.

NEBULA.

Some of my readers may perhaps feel that I have allotted an undue proportion of space to minute and inconspicuous objects. It may be so. I may have erred in supposing that others might receive as much pleasure as myself from their contemplation : yet a multitude, especially of the minuter pairs, have been passed by, as well as a great mass of remarks on the beauty or singularity of those which have been selected. But, should I have failed in communicating to others a portion of my own interest as to some parts of this list, it will be closed with a nebula which I think will not be found disappointing.



THE DUMB-BELL NEBULA, M. 27, IN VULPECULA.

Photographed at the Lick Observatory

6853 (M. 27). xix^{h} 56^{m}·1, N. 22° 30′. The 'Dumb Bell' Nebula, just visible with a $1\frac{1}{4}$-in. finder. In a rich field we find two oval hazy masses in contact, of which *p* seems to me the brighter, as it did to H. His reflector failed to resolve it, but showed the dark notches (which, as Darby remarks, are usually represented too deep) filled in and made protuberant by faint luminosity, converting the whole figure into an ellipse. The Earl of Rosse's 3-ft. speculum was thought to reach its starry components: his 6-ft. surrounds it with an external ring having a neck like a retort. Bond's achr. also seemed to resolve it, but there, as in D'A.'s figure, the form shown in small instruments is lost. The minute stars in it, of which I picked out two or three with $5\frac{1}{2}$-in. achr, and 8-in. silvered glass, and Denning sees 7 with 10-in. spec., are admirable tests for superior telescopes. Ingall has claimed 18 with $5\frac{1}{2}$-in. dialyte, from keenness of vision, and Se. has drawn many more. They seem, however, to be merely part of the host of the Galaxy; for Huggins finds there, by simultaneous comparison, nothing but luminous gas. A star in the centre, 13 m^{g}., but on photos 11·7 m^{g}., is probably the nucleus. And here the magnificent apostrophe of Kepler, which closes his speculations on the habitability of our own Sun, may well express our feelings, and form at the same time a most appropriate conclusion to the varied scenes which have passed in review since we commenced these pages:—

'Abrumpo consultò et somnum et speculationem vastissimam: tantum illud exclamans cum Psalte Rege:

'Magnus Dominus noster, et magna virtus ejus, et sapientiæ ejus non est numerus: laudate eum cœli, laudate eum Sol, Luna, et Planetæ, quocunque sensu ad percipiendum, quâcunque linguâ ad eloquendum Creatorem vestrum utamini: laudate eum harmoniæ cælestes, laudate eum vos

harmoniarum detectarum arbitri: lauda et tu anima mea Dominum Creatorum tuum, quamdiu fuero: namque ex ipso et per ipsum et in ipso sunt omnia, *καὶ τὰ αἰσθητὰ καὶ τὰ νοερά*; tam ea quæ ignoramus penitus, quam ea quæ scimus, minima illorum pars; quia adhuc plus ultra est. Ipsi laus, honor, et gloria in sæcula sæculorum! AMEN.'

APPENDIX I.

STARLESS FIELDS.

Several of these curious vacancies, through which we seem to gaze out into an uninterrupted infinity, have been mentioned by H.; but an extended list is to be found in the Cape Observations of his son, from which the following are selected as favourably situated for observation in northern latitudes. They are interesting not only from their peculiar aspect, but from the facility which they obviously afford for the detection of variable stars. The places have not been altered from the last edition, it being unnecessary for this class of Objects.

No.	R. Asc.	Dec.	Constell.	No.	R. Asc.	Dec.	Constell.
	h. m.	° ′			h. m.	° ′	
1	I 37	S 4 27	Cet.	18	XVI 33	S 24 0	Scorp.
2	I 48	S 10 38	—[1]	19	XVI 33	S 23 53	—
3	II 53	S 5 49	Erid.	20	XVI 40	S 21 4	Oph.
4	IX 37	N 17 16	Leo.	21	XVI 46	S 15 22	—
5	XVI 11	S 24 27	Scorp.[2]	22	XVII 15	S 26 45	—
6	XVI 13	S 21 24	—[3]	23	XVII 21	S 26 48	—
7	XVI 15	S 23 2	—[4]	24	XVII 22	S 26 40	—[9]
8	XVI 16	S 19 14	Oph.[5]	25	XVII 22	S 26 14	—
9	XVI 16	S 23 41	—[6]	26	XVII 26	S 8 47	—
10	XVI 17	S 23 10	—[7]	27	XVII 26	S 25 42	—
11	XVI 24	S 23 10	Scorp.[8]	28	XVII 27	S 25 59	—
12	XVI 24	S 23 32	—	29	XVII 28	S 25 52	—
13	XVI 26	S 22 58	—	30	XVII 32	S 9 23	—[10]
14	XVI 26	S 24 31	—	31	XVII 56	S 4 47	Serp.
15	XVI 29	S 24 12	—	32	XVIII 10	S 7 44	—
16	XVI 29	S 24 21	—	33	XVIII 16	S 7 8	—
17	XVI 30	S 23 7	Oph.				

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[1] Near ζ, 3^m *f*, 18′ *n*.—[2] Sa., 6½-in. spec. minute stars.—[3] Ditto.—[4] Near ρ Oph., 3^m *p*, 8′ *n*.—[5] Near ψ, 1^m *p*, 31′ *n*.—[6] Near ρ, 3^m *p*, 31′ *s* (see [2] and [3]).—[7] To 24° 18′; $1{\cdot}4^m$ *p* ρ. h., 'not the smallest star. Sky perfectly pure and superb.'—[8] To 23° 58′.—[9] To 26° 56′.—[10] Near μ, 30^s *f*, 1° 20′ *s*. h., with long attention one 17 m^g. star.

APPENDIX II.

SOUTHERN TELESCOPIC OBJECTS.

Double Stars.

The following list has been kindly drawn up by Professor Innes, of the Union Observatory, Johannesburg. It contains stars brighter than 6·5, and with less distance than 20″, south of Decl. 31°, and thus follows out the scheme of the northern section of this vol. Mr. Innes is strongly convinced that it is better in the case of a double star to give the difference of magnitude between the stars rather than absolute magnitudes. In the second col. of the table therefore the magnitude is that of the brighter star, and in the third the difference between them. Under the heading ‘ Date,’ the latest measures are given. Mr. Innes has supplied an elaborate series of notes, the most important of which will be found at the end of the table.

A.—Double Stars.

Name.	Mag.	Diff.	R.A. 1920.		Decl. S.		P.	D.	Date.
			h.	m.	°	′	°	″	
L 9721.	5·8	5·2	0	2·2	49	31	177·4	5·7	'01
L 9740.	6·3	3·2		5·0	54	26	292·0	0·8	'01
β^2 Touc.	4·5	1·3		27·9	63	24	270·2	0·7	'12 (1)
ξ Phœn.	5·8	4·4		38·1	56	56	253·1	12·6	'87
η Phœn.	4·5	7·0		39·8	57	44	217·7	19·7	'00
64 Touc.	6·2	1·9		41·2	62	56	69·1	2·5	'00
L 207.	5·8	7·3		42·0	47	57	306·6	14·3	'01
β Phœn.	3·3	0·0	I	2·5	47	9	12·5	1·1	'11 (2)
ζ Phœn.	4·1	4·3		5·0	55	41	242·2	6·1	'07
κ Touc.	5·0	2·7		13·0	69	18	350·4	5·1	'11 (3)
h. 3426.	6·3	3·0		14·3	66	50	339·0	1·9	'87
I 447.	6·3	3·5		28·3	45	59	300±	2±	'08
p Erid.	5·3	0·1		36·7	56	36	216·9	8·3	'11 (4)
χ Erid.	3·7	8·3		52·8	52	1	197·2	6·2	'00
h. 3475.	6·5	0·4		52·7	60	43	51·4	2·5	'00 (5)
h. 3527.	6·3	0·2	II	40·2	40	52	42·7	1·8	'12
η^2 Forn.	5·8	4·5		47·0	36	11	10·7	4·8	'10
θ Erid.	3·1	1·0		55·2	40	37	84·9	8·2	'00 (6)
I 55. }	5·9	0·8	III	9·6	44	4	170·8	0·7	'12 (7)
h. 3556. }	5·7	4·2					218·1	2·3	'00

A.—Double Stars.—*continued.*

Name.	Mag.	Diff.	R.A. 1920		Decl. S.		P.	D.	Date.
			h.	m.	°	′	°	″	
h. 3568.	5·7	2·0		9·2	79	18	223·9	15·2	'71
χ^2 Forn.	6·5	5·0		25·1	36	8	247·4	6·2	'09
h. 3589.	6·5	3·3		41·3	40	55	349·3	4·3	'05
h. 3592.	6·3	2·4		42·5	54	32	12·3	5·6	'97
λ 32.	6·2	7·2		44·7	36	22	44·0	2·2	'97
f Erid.	4·4	0·6		45·6	37	53	207·2	7·5	'09
Russ. 38.	6·5	1·2	IV	0·5	85	31	245·0	2·3	'00
h. 3641.	5·4	4·0		13·5	62	23	253·8	8·4	'02
L 1430.	6·3	1·1		14·9	61	9	339·0	0·9	'97
h. 3642.	6·3	2·0		15·0	34	6	159·8	6·0	'03
θ Retic.	6·1	2·1		16·6	63	27	6·5	3·6	'07
I 384.	6·4	7·1		20·2	35	44	187·0	18·8	'00
Rümk. 4.	6·5	0·3		22·3	57	15	237·9	5·7	'02
α Cæli.	4·5	7·2		37·5	42	1	111·9	5·8	'01
h. 3683.	6·4	0·1		38·7	59	6	80·6	1·5	'03
h. 3697.	6·0	2·6		47·1	41	28	280·9	14·9	'97
ι Pict.	5·2	0·7		48·7	53	36	59·1	11·1	'02
γ Celi.	4·6	5·2	V	1·5	35	35	317·5	2·8	'00
θ Pict.	6·3	0·5		22·8	52	23	195·3	0·5	'12
I 346.	5·8	8·1		24·5	41	1	180±	15±	'03
I 276.	6·2	0·3		27·4	68	41	193·4	0·8	'12
L 1922.	6·3	4·4		29·8	63	59	68·4	8·6	'00
α Colum.	2·8	9·3		36·7	34	8	358·0	11·5	'00
I 64.	5·6	5·4		49·8	37	39	233·0	18·7	'00
h. 3834.	5·8	2·9	VI	2·4	45	5	223·4	2·9	'02
Δ 23.	6·4	3·1		2·7	48	27	45·2	1·9	'08 (8)
h. 3857.	5·7	3·1		21·2	36	40	255·3	12·8	'97
G Puppis.	5·9	2·2		23·6	48	8	129·8	0·9	'11
β 753.	5·8	1·7		25·7	32	19	43·1	1·1	'98
L 2333.	5·3 8·6	0·0 0·0		27·9	50	11	261·1 117·8	0·6 0·4	'03 '03
μ Pict.	5·8	2·2		30·8	58	42	232·1	2·4	'94
β 755.	5·6	1·0		32·6	36	43	260·6	1·1	'97 (9)
Δ 31.	5·0	2·0		35·7	48	9	319·3	13·2	'02
I 5.	6·3	2·0		37·1	61	28	271·3	2·9	'00
Δ 32.	6·3	1·4		39·6	38	19	276·0	7·6	'02
I 179.	6·5	3·4		42·0	30	19	224·2	3·9	'12
I 351.	6·4	3·5		42·2	71	41	333·8	10·8	'00
h. 3891.	5·9	2·9		42·4	30	52	223·8	4·9	'00
I 157.	6·4	2·8		45·1	54	36	348·1	1·7	'01
I 159.	6·4	4·8		47·6	45	21	323·6	6·3	'00 (10)

A.—Double Stars.—*continued.*

Name.	Mag.	Diff.	R.A. 1920.		Decl. S.		P.	D.	Date.
			h.	m.	°	′	°	″	
I 65.	6·2	0·5		53·4	35	23	216·3	0·3	'03
Δ 39.	5·7	1·2	VII	2·0	59	4	80·7	1·9	'12
h. 3928.	6·3	1·1		2·6	34	40	154·5	3·2	'02
β 757.	5·9	2·9		9·6	36	24	69·5	3·0	'03
γ Volant.	3·7	1·8		9·5	70	22	300·5	13·6	'02
L 2735.	6·1	0·4		11·3	63	3	157·1	0·5	'02
Rümk. 6.	5·9	0·6		18·4	52	10	21·0	8·8	'02
h. 3966.	6·3	0·1		22·0	37	8	143·5	6·8	'02
d^2 Puppis.	5·7	2·7		36·9	37	57	151·7	1·5	'02
h. 3997.	6·5	0·1		37·0	74	6	115·0	1·8	'12 (11)
ζ Vol.	3·9	5·7		42·8	72	24	116·2	16·9	'01
I 161.	5·1	4·0		44·6	38	18	84·0	10·6	'02
λ 88.	5·5	8·3		47·4	56	12	185·1	5·8	'97
Howe 8.	5·0	3·7		49·3	34	30	285·6	2·8	'12 (12)
λ 91.	6·0	0·1		53·2	43	38	302·4	0·4	'97
N Puppis.	5·1	7·5		54·6	43	53	35·8	9·8	'97 (13)
I 26.	6·1	0·8		55·0	47	40	32·4	0·6	'11
V Puppis.	Var.	5·9 0·2		55·9	49	1	72·2 49·9	6·8 18·7	'97 (14)
Δ 63.	6·4	1·0	VIII	7·1	42	24	80·9	5·5	'07
ε Vol.	4·5	3·2		7·6	68	22	23·5	6·1	'00
λ 96.	6·1	0·3		10·0	46	1	281±	0·3±	'97
C Carin.	5·3	2·5		14·1	62	39	61·0	3·6	'97
h. 4073.	6·5	0·5		14·2	37	7	177·9	2·1	'10
h. 4085.	5·2	6·2		18·3	36	13	270·0	6·1	'95
B Velor.	4·9	1·8		20·1	48	13	140·6	0·8	'13
h. 4093.	6·2	0·3		23·3	38	47	122·7	8·0	'07
A Velor.	5·5	2·7		26·5	47	40	240·7	3·7	'02
Δ 70.	5·1	1·4		26·8	44	27	351·0	4·3	'02
I 168.	6·5	3·5		28·0	24	28	79·0	3·3	'02
h. 4107.	6·2	1·9		28·5	38	48	327·5	4·2	'10
Sellors 8.	5·8	1·2		29·9	52	56	300·2	0·8	'13
I 195.	6·2	2·7		31·4	37	20	42·4	2·3	'00 (15)
h. 4125.	5·4	4·9		35·9	62	34	233·7	8·0	'72 (16)
I 314.	6·1	2·5		36·3	36	19	239·4	1·0	'00
Cord. 18.	5·2	3·5		37·4	39	58	63·2	3·8	'12
h. 4128.	6·4	0·7		37·5	60	2	217·1	1·6	'12
h. 4130.	6·4	2·6		38·8	57	15	227·2	3·5	'97
δ Arg.	2·0	4·0		42·2	54	24	166·0	2·4	'11 (17)
Rümk. 9.	6·3	0·4		43·2	58	26	295·1	4·2	'02
f Velor.	4·9	4·7		47·7	46	13	83·6	3·1	'97

A.—Double Stars.—*continued.*

Name.	Mag.	Diff.	R.A. 1920.		Decl. S.		P.	D.	Date.
			h.	m.	°	′	°	″	
L 3609.	5·4	8·0		49·5	66	29	250±	18±	'94
Cape 9.	6·5	2·0		50·3	51	49	78·6	3·1	'11
H Velor.	4·8	3·0		53·9	52	25	343·6	3·0	'02 (18)
λ 108.	6·1	6·9		57·4	42	52	45·8	2·8	'97
h. 4165.	5·4	2·0		58·3	51	53	101·4	1·3	'01
h. 4178.	6·5	3·4	IX.	2·7	57	32	165·6	3·4	'00
λ Arg.	2·2	11·8		5·1	43	7	133·7	17·1	'97
h. 4188.	5·7	0·5		9·5	43	17	282·0	3·1	'02
z Velor.	5·2	4·1		11·4	42	54	11·7	5·6	'97
I 11	6·3	1·2		12·3	45	13	275·0	0·8	'11
k Velor.	4·7	8·3		12·5	37	5	125·7	11·3	'97
I 358.	5·4	6·8		16·2	68	21	132·4	18·1	'01
L 3846.	5·4	4·6 0·6		17·6	74	33	340·7 264·6	7·0 0·3	'00 '02
h. 4213.	6·0	3·4		23·5	61	36	326·3	8·8	'76
ζ^1 Antl.	5·9	0·8		27·3	31	32	210·2	8·2	'07
ψ Arg.	3·6	2·0		27·5	40	7	118·3	1·1	'12 (19)
h. 4220.	5·4	0·6		30·9	48	39	210·0	3·7	'08
Russ. 125.	6·5	3·5		33·5	48	23	167·7	3·2	'98
λ 115.	5·5	0·0		34·5	53	18	162·6	0·6	'11
υ Arg.	3·1	3·9		45·1	64	41	128·6	5·0	'11
Δ 81.	5·8	2·1		51·1	44	54	238·6	5·5	'97
Harg. 47.	6·3	1·5	X	1·1	61	29	353·8	1·4	'99
I 173.	5·2	2·4		3·0	46	58	57·4	0·5	'01
L 4203.	6·1	2·4 4·1		7·5	68	17	141·9 40·2	0·7 25·9	'11 '01
h. 4306.	6·2	0·0		16·6	64	15	137·8	2·2	'86
J Velor.	4·6	3·4		17·9	55	38	105·2	7·2	'97 (20)
s Velor.	5·6	0·3		28·5	44	39	217·4	13·3	'03
p Velor.	4·1	0·5		33·9	47	48	267·0	0·5	'97
t Carin.	4·7	2·8		35·7	58	46	20·1	14·7	'10
μ^2 Arg.	2·8	3·5		43·3	48	59	61·6	2·5	'00 (21)
δ Cam.	5·5	0·3		44·5	80	2	65·3	0·6	'12
Russ. 161	6·1	1·0		46·2	58	54	271·6	1·6	'97 (22)
h. 4383.	6·1	0·8		51·1	70	17	281·2	1·2	'92
I 211.	5·8	4·0		55·3	33	18	178·7	1·5	'13
Russ. 164.	6·3	3·5		56·0	60	53	81·7	3·8	'02
h. 4409.	5·3	3·8	XI	3·6	42	11	270·0	1·9	'97
h. 4423.	6·5	0·3		12·7	45	26	280·4	2·6	'13
π Centauri.	4·3	1·4		17·4	54	3	128·2	0·5	'12
h. 4432.	5·3	1·2		19·9	64	31	298·1	2·4	'13

A.—DOUBLE STARS.—*continued.*

Name.	Mag.	Diff.	R.A. 1920.		Decl. S.		P.	D.	Date.
			h.	m.	°	′	°	″	
I 883.	5·9	0·2		23·1	52	47	270·7	0·4±	'11
Δ 109.	5·3	2·5		24·7	47	14	167·1	13·3	'01
o Centauri.	5·0	5·5		28·0	59	0	125·8	15±	'00
I 78.	5·5	0·1		29·7	40	9	89·4	1·2	'10
h. 4455.	5·9	2·2		32·6	33	8	243·1	3·3	'10
L 4920.	5·1	2·8		47·9	64	46	161·9	1·6	'12
β Hydræ.	4·4	0·4		48·9	33	27	353·5	1·6	'10
Howe 17.	6·5	2·2		50·4	37	19	279·6	2·1	'13
λ 140.	6·4	2·0		52·7	46	38	198·5	1	'97
L 4945.	6·3	3·5		53·0	32	53	285±	7±	'00
ε Cham.	5·0	0·8		55·6	77	47	186·4	1·1	'13 (23)
h. 4498.	6·0	1·7	XII	2·2	65	16	61·6	8·7	'02
Jacob. 8.	6·1	2·0		5·9	34	16	23·6	3·2	'13
I 423.	6·5	4·5		6·9	44	59	167·0	2·2	'11 (24)
Howe 19.	6·4	2·1		9·4	33	21	174·1	1·4	'13
D Centauri.	5·3	1·2		9·8	45	17	244·8	3·5	'11
Russ. 193.	6·3	0·4		13·6	35	39	166·3	1·1	'10
h. 4518.	6·2	2·1		20·5	40	57	207·6	10·1	'07
x^2 Centauri.	5·8	0·2		21·6	34	45	41·4	0·2	'97
α Crucis.	1·0	0·5		22·1	62	40	118·4	5·0	'02 (25)
L 5202.	6·5	7·2		29·6	49	28	100±	15±	'97
I 296.	6·5	2·3		34·0	74	56	274·2	1·8	'01
γ Centauri.	2·4	0·0		37·0	48	32	169·7	1·0	'11 (26)
β Muscæ.	3·3	0·3		41·3	67	41	350·2	1·0	'11 (27)
L 5299.	6·3	4·7		47·7	53	24	211·0	6·4	'03
f Centauri.	5·0	5·8	XIII	1·6	47	52	78·8	11·9	'00
Russ. 213.	6·1	0·2		2·5	59	26	26·0	0·8	'12
θ Muscæ.	5·6	1·4		2·9	64	52	187·5	5·7	'02
I 424.	4·8	3·2		7·3	59	29	345·5	1·5	'02 (28)
λ 176.	6·4	6·8		14·5	59	21	208·6	13·0	'97
Sellors 18.	6·3	0·9		18·1	47	31	224·0	0·8	'95 (29)
α Centauri.	4·0	0·3		26·4	39	0	104·8	0·2	'97
I 365.	5·6	0·2		31·7	61	17	214·3	0·4	'02 (30)
Russ. 223.	6·4	4·8		31·9	58	0	22±	5·2±	'97
Q Centauri.	5·4	1·4		36·6	54	9	165·7	5·0	'09
I 223.	6·2	3·1		41·6	62	11	319·4	9·3	'00 (31)
Howe 24.	6·5	2·8		44·3	35	18	354·4	11·6	'12
N Centauri.	5·4	2·0		46·9	52	25	288·7	18·2	'97
k Centauri.	4·5	1·4		47·2	32	36	107·3	7·3	'09
β 343.	6·2	1·0		47·4	31	13	112·8	1·2	'10 (32)
h Centauri.	4·8	1·5		48·6	31	32	183·8	14·3	'03

A.—Double Stars.—*continued.*

Name.	Mag.	Diff.	R.A. 1920.		Decl. S.		P.	D.	Date.
			h.	m.	°	′	°	″	
y Centauri.	5·6	0·2		48·6	35	16	93·2	1·0	'10 (33)
Russ. 227.	6·4	1·0		51·1	53	42	357·2	1·4	'11 (34)
h. 4632.	6·2	4·4		52·4	65	25	14·3	6·5	'00
β 1197.	6·3	1·7		58·4	31	18	195·2	1·3	'10 (35)
Cordoba 33.	6·5	1·8	XIV	9·1	61	19	159·3	2·6	'11
h. 4672.	5·7	2·9		15·1	42	41	304·0	4·0	'03
Δ 159.	4·9	2·0		16·8	58	5	162·1	9·8	'02
Russ. 244.	6·3	2·8		17·4	47	57	123·4	4·0	'02
τ^2 Lupi.	4·5	0·1		21·0	45	2	176·7	0·3	'02
I 426.	5·5	4·7		25·0	44	57	311·8	10·4	'02
η Centauri.	2·6	10·9		30·4	41	48	270·1	5·6	'97 (36)
a Lupi.	5·4	2·5		31·9	45	47	23·6	19·5	'07
α Centauri.	0·1	1·4		34·3	60	30	216·8	18·7	'12 (37)
α Circini.	3·4	5·4		36·0	64	37	236·4	15·8	'01 (38)
b Lupi.	5·2	6·8		41·4	52	3	259·9	9·0	'97
I 236.	5·6	2·7		45·1	72	52	102·4	1·7	'01
β 347.	5·9	4·6		49·7	32	59	319·5	13·9	'98
h. 4715.	5·8	1·2		51·1	47	33	277·7	2·7	'97
π Lupi.	4·0	0·2		59·6	46	45	87·7	1·5	'12 (39)
λ Lupi.	4·4	0·3	XV	3·4	44	59	193·4	0·6	'02
h. 4734.	5·6	6·2		5·3	55	3	246·3	11·4	'97 (40)
I 329.	6·5	0·6		7·5	61	3	330·5	0·7	'00
I 428.	6·0	5·2		10·1	60	37	316·6	10·6	'01
I 370.	5·5	7·6		11·4	60	12	117·5	5·2	'02
μ Lupi.	4·5	0·4		12·9	47	34	134·5	1·7	'10 (41)
I 332.	6·5	2·0		13·3	67	11	107·6	1·1	'01
λ 228.	5·6	7·1		16·7	60	22	119·6	6·0	'97
ϕ^1 Lupi.	3·6	10·7 10·2		16·7	35	58	239·7 119·3	16·7 17·2	'97
γ Circini.	4·5	0·3		16·8	59	2	79·1	1·5	'09
ε Lupi.	3·7	3·0		17·2	44	24	276·2	1·4	'02 (42)
h. 4776.	6·5	1·5		25·0	41	38	228·6	5·5	'07
γ Lupi.	3·0	0·2		29·8	40	54	90·9	0·6	'01 (43)
d^2 Lupi.	4·8	3·0		30·4	44	41	1·5	2·2	'03 (44)
κ^2 Apodis.	5·8	7·0 8·0		31·4	73	11	120± 260±	15± 15±	'91
ω Lupi.	4·3	7·0		32·7	42	18	25·8	11·5	'00
Howe 37.	6·3	1·4		39·0	41	34	345·6	3·5	'11
Rümk. 20.	5·8	0·0		40·5	64	11	151·0	1·5	'09
λ 249.	6·1	7·9		42·3	37	39	130·2	15·2	'97
I 548.	6·2	4·8		44·7	45	9	168·5	1·8	'11

A.—Double Stars.—*continued.*

Name.	Mag.	Diff.	R.A. 1920.		Decl. S.		P.	D.	Date.
			h.	m.	°	′	°	″	
Sellors 11.	6·3	1·5		48·1	60	30	133·7	0·8	'00
I 333.	6·5	0·1		48·7	77	47	95·2	1·2	'97
h. 4813.	6·0	3·5		48·8	59	56	98·9	3·6	'97
ξ Lupi.	5·2	0·3		51·8	33	43	48·6	10·8	'03
η Lupi.	3·6	4·1		54·8	38	10	21·2	14·5	'09
Cordoba 42.	6·5	3·7		55·5	40	12	157·3	8·7	'03
ι Normæ.	4·9	0·2 3·3		57·0	57	33	231·8 248·4	0·5 11·7	'02 '10 (45)
L 6706.	6·3	0·7	XVI	4·4	32	26	85·2	7·8	'97
κ Normæ.	5·1	8·8		7·1	54	23	209·8	17·5	'97
λ Normæ.	5·6	0·9		15·1	42	29	162·5	0·4	'02
I 91.	6·2	4·4		15·1	39	14	298·2	9·7	'03
h. 4843.	6·5	0·5		18·8	33	1	153·2	5·9	'07
L 6912.	5·6	3·4		35·3	48	37	11·6	1·7	'97 (46)
		1·2					266·1	9·5	'97
		4·4					162·0	13·0	'00
		4·4					14·8	13·4	'00
		5·4					194·5	21·1	'00
h. 4889.	6·2	2·0		45·6	37	22	6·1	6·9	'97
L 6983.	6·1	6·3		48·0	63	8	315±	7±	'97
I 567.	6·2	4·5		49·4	41	1	270±	4±	'09
λ 316.	6·1	0·8		54·4	48	32	185·6	0·6	'02
L 7086.	6·3	7·0		57·7	47	3	240±	7·5±	'97
λ ——.	6·1	5·0	XVII	0·9	37	7	84·8	7·1	'97
λ 320.	5·6	0·6		6·7	39	25	294·0	0·6	'97
Brisbane.	5·6	2·7		12·9	46	33	140·0	2·3	'11 (47)
L 7215.	5·9	0·6 4·3		13·5	34	9	258·4 133·5	2·1 30·3	'12 '11 (48)
L 7213.	5·9	11·0		16·0	57	56	187·4	2·11	'00 (49)
γ Aræ.	3·5	7·1		18·7	56	18	329·0	18·1	'02
κ Aræ.	5·2	4·4 1·0		19·7	50	33	159·4 274·7	76·1 4·7	'00 AB '00 BC
h. 4949.	5·6	1·0		20·9	45	46	262·1	2·6	'02 (50)
Δ 217.	6·5	2·3		23·2	43	54	170·2	13·3	'81
I 40.	6·3	4·0		25·9	45	59	210·6	17·8	'00
h. 4962.	5·7	5·7		29·5	32	32	102·6	5·7	'07
θ Scorp.	2·0	12·0		31·6	42	57	316·9	6·8	'97
h. 4978.	5·9	3·0		44·0	53	36	268·9	12·0	'02
β 1123.	6·2	0·4		48·0	34	42	220·4	0·3	'97 (51)
λ 342.	5·7	0·3		48·0	34	52	286·1	0·4	'96
I 1013.	6·4	1·5		52·4	39	7	165±	0·6±	'10

A.—Double Stars.—*continued.*

Name.	Mag.	Diff.	R.A. 1920.		Decl. S.		P.	D.	Date.
			h.	m.	°	′	°	″	
L 7542.	5·8	6·0		59·4	35	54	289·7	12·6	’00
h. 5014.	5·0	0·0	XVIII	1·0	43	26	236·8	1·8	’10 (52)
L 7507.	5·9	3·0		1·4	73	41	232·1	2·6	’01
h. 5015.	6·4	4·4		2·6	45	47	256·3	4·1	’97 (53)
L 7574.	6·3	3·5		9·5	68	16	298·3	2·5	’01
I 249.	6·2	4·6		11·9	63	55	4·3	7·1	’00
η Sagitt.	3·2	7·1		12·2	36	48	105·3	3·9	’97
ξ Pavonis.	4·2	4·0		15·9	61	32	150·1	3·3	’02 (54)
Howe.	5·4	5·7		25·8	33	3	197·0	2·9	’00
Russ. 314.	6·2	2·8		39·9	73	5	262·3	1·8	’98
I 113.	6·5	3·8		52·8	48	37	227·5	2·6	’11
Brisbane.	6·0	0·2		55·6	37	10	282·5	12·3	’03
γ Cor. Aust.	4·3	0·0	XIX	1·0	37	10	105·0	2·0	’11 (55)
Gale.	5·6	2·0		9·2	66	48	39·5	0·8	’01
I 121.	5·5	1·8		44·0	59	24	89·0	0·6	’00
L 8337.	6·5	0·3	XX	4·5	57	46	227·9	0·7	’01
h. 5173.	5·3	5·9		5·9	36	18	122·0	9·0	’00 (56)
κ^2 Sagitt.	5·7	2·0		18·4	42	41	195·1	1·4	’97
Russ. 321.	6·3	2·2		21·7	37	40	83·4	1·3	’02 (57)
Rümker 26.	5·8	0·0		45·0	62	44	93·9	2·4	’11 (58)
L 8625.	5·8	0·3	XXI	0·9	73	29	134·4	8·4	’02 (59)
θ Indi.	4·6	2·5		14·2	53	47	281·5	4·8	’11
θ^1 Micros.	5·9	0·3		19·3	41	21	292·3	1·0	’00
Mel. 6.	5·6	2·1		21·9	42	54	145·8	2·9	’00
λ Octan.	5·4	2·1		38·9	83	6	79·6	3·2	’00
π^2 Gruis.	5·8	6·7	XXII	18·2	46	20	207·3	4·6	’01
δ Touc.	4·8	3·3		21·7	65	22	281·6	6·8	’99 (60)
δ^1 Gruis.	4·0	7·0		24·5	43	54	205±	6±	’10
β 771.	5·8	4·5		32·3	41	0	256·1	2·4	’97
Cord. 63.	6·3	4·2		38·1	47	38	131·9	7·9	’02
I 340.	6·1	3·0		46·9	63	37	11·5	1·0	’12
γ Pisc. Aust.	4·5	4·3		48·1	33	18	264·0	4·0	’09
δ Pisc. Aust.	4·3	5·4		51·5	32	58	232·6	5·0	’09
β 1011.	6·5	3·0		58·1	36	52	296·1	2·2	’09
θ Gruis.	4·4	3·0	XXIII	2·4	43	58	30·0	1·4	’06
Δ 246.	6·1	0·5		2·6	51	8	257·6	8·0	’09
Δ 248.	6·1	2·7		16·3	50	44	209·9	16·0	’09
Howe.	6·5	2·9		32·8	32	19	251·2	5·3	’98
θ Phœn.	6·3	0·6		35·2	47	5	271·2	4·1	’09
h. 5437.	6·5	3·7		56·4	53	32	293·0	2·0	’91

NOTES.

(1) β^2 Toucani. Bin., angle decreasing 3° a year. *Comes*, decidedly yellow, although spectrum is A. 3rd bright star near.

(2) β Phœnicis. Bin., in slow retrograde motion. 11 m^{g}., 40″, *nf*.

(3) κ Toucani. Yellow, purp. or blsh. Bin., slow retrograde motion, distance nearly constant at 5″. I. 27, 319″ *np*., m^{g}. 7·3, is in direct motion. It has a similar P. motion with κ, and forms a quadruple system.

(4) *p* Eridani. Bin. Gore, 302 yrs. Dist. increasing till 1975. Position angle decreases 2° in three years. Assuming that the mass of this system is equal to that of the sun, its parallax would be 0″·16 (20 light years); or if it is assumed that its luminosity is equal to the sun's, its parallax would be 0″·09 (36 light years).

(5) h. 3475. Slow increase in angle.

(6) θ Eridani. Very slow increase of angle. Spect. Bin.

(7) I 55. Triple system, both *comites* in retrograde motion.

(8) Δ 23. Fine binary. h. '35 : 342°·5 : 3″·9.

(9) β 755. A 10 m^{g}. at 21″.

(10) I 159. Orange, bl.

(11) h. 3997. Angle increasing slowly.

(12) Howe 8. Change doubtful; good colour contrast.

(13) N Puppis. A 13 m^{g}. at 23″.

(14) V Puppis. Spect. Bin.

(15) I 195. Chief star orange.

(16) h. 4125. Angle increasing.

(17) δ Argûs. Retrograde motion. 11 m^{g}. 69″ away.

(18) H Velorum. Fine colour contrast.

(19) ψ Argûs. Fine binary discovered by Copeland.

(20) *j* Velorum. Slightly var. in magnitude, and *var.* spectrum.

(21) μ Argûs. Very fine col. contrast.

(22) Russell 161. Angle increasing slowly.

(23) ε Chamelionis. Slow increase in angle.

(24) I 423. Good colour contrast.

(25) α Crucis. This fine double is prettily situated. It shows no sign of motion, indicating that although its luminosity is high, its mass must be remarkably small.

(26) γ Centauri. Bin. Per. 88 yrs. (See.). 14 m^{g}. 40″ *sf*.

(27) β Muscæ. Disc. by Russell, '80. Angle increasing slowly.

(28) I 424. Several faint stars about 50″ dist.

(29) Sellors 18. An 8 m^{g}. 38″ *nf*.

(30) I 365. Bin. ? c.p.m. Three dist. *comites*.

(31) I 223. Marked col. contrast.

(32) β 343. Motion.

(33) *y* Centauri. Angle increasing.

(34) Russell 227. Angle increasing.

(35) β 1197. Angle increasing.

(36) η Centauri. Spect. composite and var.

(37) α Centauri. This fine double star is the nearest star to the solar system. Bin. Per. 83·6 yrs. (Doberck). According to this orbit the place in 1918 should be P. 221°·5, D. 15″·2. The closest approach, 4″, will take place in 1939. In mass and spect. the chief star resembles the sun. Several faint stars in field, none of which belong to the system.

(38) α Circini. Remarkable colour contrast, yellowish, and red; angle slowly decreasing.

(39) π Lupi. Arrest of motion since 1886.

(40) h. 4734. Angle increasing.

(41) μ Lupi. Slow motion. Δ., 3rd star, 7·2 m^g. 23″ *sf*.

(42) ε Lupi. Slow decrease in angle; 9 m^g. 27″ *s*.

(43) γ Lupi. A puzzling pair, found by h. '35, measured by Jacob, '53 and '56. Single at Sydney, '71–'96. Seen and measured by I., '00–'10. All angles comprised between 88° and 95°.

(44) *d* Lupi. Angle increasing.

(45) ι Normæ. Close pair. Binary.

(46) L 6912. A beautiful multiple star. Spect. of chief star peculiar in having the hydrogen lines narrow. Group of stars *f*.

(47) L 7194. Binary. Good colour contrast. 11·5 m^g. star *p*.

(48) L 7215. Ternary, with p.m. of 1″·15. Per. slightly greater than 50 yrs.

(49) L 7213. Many faint stars near.

(50) h. 4979. Slow decrease in angle.

(51) β 1123. In a large cluster.

(52) h. 5014. Bin., decrease in angle; and widening.

(53) h. 5015. Slow decrease in angle.

(54) ξ Pavonis. Good colour contrast.

(55) γ Coronæ Aust. Binary. Per. 152 yrs. Distance will increase to 3″·5 (1953).

(56) h. 5173. c.p.m. of 1″·6.

(57) Russell 321. Binary, in slow motion.

(58) Rümker 26. Slow decrease in angle.

(59) L 8625. I doubled 5·8 in 1898.

(60) δ Toucani. Colour contrast.

ADDITIONAL DOUBLE STARS.

Hu. 1345. I^h 31^m·2, S. 57° 25′ : 6·5, 12 : 201° : 5″·4.

γ Argûs. VIII^h 7^m·1 S. 47° 5′ : 2·2; has a bright companion at 42″ and two other bright stars near it, making it one of the most beautiful objects in the heavens. Spect. of bright lines.

Brisbane 3574. XI^h 21^m·2, S. 61° 13′ : 7·8, red. One of the most remarkable binaries by reason of its faintness and separation (h. 6″·4, '38; I., 60°·3 : 2″·1, '11).

B.—STARS WITH REMARKABLE SPECTRA.

Abbreviations : E., *Ellery.*—C., *Copeland.* F., *Fleming.*
P., *Pechüle.*

Name.	R.A. 1920.		S. Decl.		Mag.	Type.	Discoverer.
	h.	m.	°	′			
Es.-Birm. 67.	III	10·5	57	37	6·3	III. (IV.?)	P.
Star.	IV	44·5	36	21	7·6	IV.	F.
α Columbæ.	V	36·7	34	7	2·7	Hy.	F.
Es.-Birm. 154.	V	40·4	46	30	7½	IV.	P.
κ Canis Maj.	VI	46·8	32	24	3·8	Hy.	F.
Star.	VI	51·9	42	16	6·0	IV.	F.
Star.	VII	15·5	36	35	4·7	Hy.	F.
Es.-Birm. 256.	VII	53·5	49	46	7·8	IV.	P.
γ Argûs.	VIII	6·9	47	6	Var.	Hy.	Respighi.
r Puppis.	VIII	10·5	35	39	4·8	Hy.	F.
Star.	VIII	12·4	46	14	6·6	Hy.	Cannon.
Star.	VIII	52·2	57	20	8·8	V.	C.
E Carinæ.	IX	5·0	70	13	4·9	Hy.	F.
Es.-Birm. 304.	IX	52·2	41	12	7·3	IV.	P.
SZ Carinæ.	IX	57·3	59	50	7¾ var.	IV.	P.
Star.	X	7·8	60	15	9·4	V.	F.
Es.-Birm. 307.		8·4	34	50	7·0	IV.	P.
Star.		9·1	57	40	6·1	Hy.	F.
Star.		14·5	57	31	10·0	V.	F.
J Velorum.		17·9	55	39	4·6	Hy.	F.
p Carinæ.		29·1	61	16	3·6	Hy.	F.
Es.-Birm. 311.		31·7	39	8	6·5	IV.	P.
Star.		38·2	59	16	6·4	V.	F.
Star.		38·7	38	21	9·0	V.	C.
Star.		41·1	59	42	6·7	V.	F.
Star.		41·3	59	18	8·6	V.	F.
η Argûs.		42·0	59	16	Var.	Nova.	Le Sueur.
Star.		44·1	58	46	9·6	V.	F.
Star.		48·7	61	46		V.	F.
Star.		56·3	57	24		V.	F.
Nova.		59·2	53	59		Nova.	Leavitt.
Star.	XI	3·1	65	5	8·3	V.	F.
RS Carinæ.		4·5	61	30	8	Nova.	F.
Star.		6·6	60	32	8·0	V.	C.
δ Centauri.	XII	4·2	50	17	2·8	Hy.	F.
TV Centauri.		10·4	51	5	Var.	IV.	Douglass.
γ Crucis.		26·7	56	40	2·0	III.	E.
Star.		38·1	62	37	6	Hy.	F.

B.—Stars with Remarkable Spectra.—*continued.*

Name.	R.A. 1920.		S. Decl.		Mag.	Type.	Discoverer.
	h.	m.	°	′			
Star.		50·0	56	44	5·5	Hy.	F.
Star.		57·6	71	3	6·6	Hy.	F.
θ Muscæ.	XIII	2·9	64	53	5·6	V.	F.
Star.		25·6	61	40	9·6	V.	F.
Star.		37·3	67	0	9·0	V.	F.
Z Centauri.		42·3	31	14	7	Nova.	F.
μ Centauri.		44·8	42	5	3·4	Hy.	F.
Star.		48·4	46	44	5·9	Hy.	F.
Star.		52·9	55	58	Var.	IV.	F.
Star.	XIV	9·5	56	43	5·2	Hy.	Cannon.
η Centauri.		30·4	41	48	2·5	Hy.	F.
Nova Circin.		42·0	59	42	9·5	Nova.	Leavitt.
σ Libræ.		59·4	24	57	3·5	III.	E.
Es.-Birm. 422.	XV	6·6	69	47	6·2	IV.	F.
Star.		17·5	62	23	8·8	V.	F.
κ¹ Apodis.		22·7	73	6	5·6	Hy.	Pickering.
R Normæ (Nova).		23·6	50	28	7	Nova.	F.
Star.		56·8	62	28	8·8	V.	F.
Nova Aræ.	XVI	34·6	52	16	6	Nova.	F.
Star.		46·0	41	6	5·3	V.	F.
Star.		46·7	41	44	6·6	V.	F.
ζ¹ Scorpii.		48·4	42	14	4·9	Hy.	F.
Star.		48·5	41	42	6·7	V.	C.
Star.		49·4	41	1	6·0	V.	F.
Star.		58·5	37	44	6·7	V.	F.
Star.	XVII	13·6	45	33	7·2	V.	F.
Star.		17·3	47	24	5·5	Hy.	F.
α Aræ.		25·5	49	49	2·9	Hy.	F.
SX Scorpii.		42·1	35	40	Var.	IV.	F.
Star.		48·0	34	42	6·2	Hy.	F.
Nova 2 Scorpii.		48·8	34	20	8·8	Nova.	Cannon.
Star.		56·4	32	42	8·8	V.	F.
η Sagittarii.	XVIII	12·2	36	47	3·3	III.	E.
T Indi.	XXI	14·9	45	22	Var.	IV.	F.
π¹ Gruis.	XXII	17·8	46	21	6·7	IV.	F.
δ² Gruis.		25·0	44	10	4·4	III.	E.
β Gruis.		37·9	47	18	2·2	III.	P.

C.—KNOWN VARIABLE STARS.

Name.	R.A. 1920.		Decl.		Var.	Per.	Discoverer.
	h.	m.	°	′			
S Sculpt.	0	14·3	32	29	6·6–12·8	336^{d}	F.
R Sculpt.	I	23·3	32	57	6·2–8·8	376·4	Gould.
R Horol.	II	25·4	50	16	5·9–12	405	F.
V Horol.	III	1·7	59	14	7–9·3	—	F.
R Rectic.	IV	32·7	63	12	7–12	273·4	Ragoonath.
R Doradus.		35·8	62	14	4·8–6·8	345	Gould.
R Cœli.		37·7	38	24	7·2–14	398	F.
R Octant.	VI	3·0	86	26	7·3–12·2	408	F.
L^2 Puppis.	VII	10·1	44	31	3·4–6·2	140·2	Gould.
S Puppis.		43·8	47	52	7·2–9	—	Gould.
V Puppis.		55·9	49	2	4·1–4·8	1·45	Williams (Algol).
RS Puppis.	VIII	10·0	34	21	6·8–7·9	41·3	Reitsma.
V Carinæ.		27·1	59	51	7·2–8·0	6·66	Roberts.
X Carinæ.		29·6	58	57	7·9–8·7	0·54	Roberts (Algol).
T Velor.		35·1	47	5	7·6–8·5	4·64	Roberts.
W Carinæ.	IX	19·9	55	37	7·5–8·2	4·38	Roberts.
N Velor.		28·8	56	41	3·4–4·4	Short	Gould.
R Carinæ.		30·2	62	26	4·5–10	309·3	Gould.
l Carinæ		43·0	62	8	3·6–5·0	35·5	Gould.
R Ant.	X	6·3	37	20	7·2–7·8	—	Gould.
S Carinæ.		6·8	61	9	5·8–9·0	148·7	Gould.
η Argûs.		42·0	59	16	1–7·4	Nova ?	Burchell.
T Carinæ.		53·0	60	1	6·7–7·0		Gould.
U Carinæ.		54·5	59	18	6·7–8·5	38·7	Roberts.
X Cent.	XI	45·2	41	18	7·8–12·4	314	F.
S Muscæ.	XII	8·5	69	42	6·4–7·3	9·66	Roberts.
T Crucis.		17·0	61	46	6·8–7·6	6·7	Roberts.
R Crucis.		19·5	61	6	6·8–7·9	5·8	Roberts.
S Centauri.		20·3	49	0	8·1–9·5	—	F.
R Muscæ.		37·2	68	58	6·5–7·6	0·882	Gould.
S Crucis.		49·6	58	0	6·5–7·6	4·69	Roberts.
T Centauri.	XIII	37·1	33	12	6·5–9·2	90·3	Markwick.
R Centauri.	XIV	10·8	59	32	5·3–13	568·2	Gould.
V Centauri.		27·1	56	32	6·4–7·8	5·49	Roberts.
R Apodis.		48·7	76	20	5·5–6·2	?	Gould.
T Tri. Aust.	XV	2·2	68	25	6·9–7·4	0·98	Gould.
R Tri. Aust.		12·6	66	12	6·7–7·4	3·39	Gould.
R Normæ.		29·6	49	14	7–11·5	480·7	Gould.
T Normæ.		37·9	54	44	7–12	243·9	Innes.
R Lupi.		48·3	36	3	9<12	234·5	Gould.
S Tri. Aust.		54·0	63	33	6·4–7·4	6·32	Gould.

C.—Known Variable Stars—*continued.*

Name.	R.A. 1920.		Decl.		Var.	Per.	Discoverer.
	h.	m.	°	′			
U Tri. Aust.	XVI	0·2	62	42	7·7–8·7	2·55	Roberts.
S Normæ.		12·2	57	42	6·6–7·6	9·75	Roberts.
R Aræ.		33·1	56	50	6·8–7·9	4·42	Roberts (Algol).
RS Scorp.		49·8	44	58	7–11·4	323	F.
RV Scorp.		53·1	33	29	6·7–7·4	6·1	Roberts.
S Octant.	XVII	34·7	86	47	8·2–12·1	258	F.
R Pavon.	XVIII	5·2	63	38	7·5–9·8	229	F.
RS Sagitt.		12·3	34	8	6·4–7·5	2·4	Gould (Algol).
κ Pavon.		48·7	67	20	3·8–5·2	9·09	Thome.
S Cor. Aust.		55·8	37	4	9·5–13	—	Schmidt.
R Cor. Aust.		56·5	37	4	9·7<11	89·2	Schmidt.
T Cor. Aust.		56·6	37	5	11–13	—	Schmidt.
RY Sagitt.	XIX	11·3	33	40	6·5<11·5	Irreg.	Markwick.
S Pavon.		48·5	59	24	7–8·7	385	F.
RU Sagitt.		53·2	42	4	9–13·1	242	F.
RT Sagitt.	XX	12·4	39	22	7·7–10·7	304	F.
S Gruis.	XXII	21·2	48	51	7·2–12·3	400	Pickering.
R Indi.		30·3	67	42	8·5–12·5	216	Gould.
R Phœn.	XXIII	52·3	50	14	7·4–13	270	Gould.
S Phœn.		54·9	57	1	7·2–8·7	151·2	F.

Notes.

η Argûs. 1677, 4 m^{g}.; 1751, 2 m^{g}.; 1811–15, 4 m^{g}.; 1822–6, 2 m^{g}.; 1827, 1 m^{g}.; 1828–33, 2 m^{g}.; 1838–43, 1 m^{g}.; 1843–50, nearly or quite equal to Sirius, with some strange fluctuations, 1845–48. Lost to nearly all eyes, '62, or as others, '64. 5 m^{g}., '65; 6·8, 1892, Roberts. 1899–1914, no var.; 7·8 m^{g}., Innes. The spectrum, according to Pickering and Gill, is similar to that of a Nova. There is a similarity with P Cygni, not only in its fluctuations, and in having become apparently constant, but also both are situated near the bifurcation of the Milky Way, both are in the richest regions of Type V stars. η Argûs was seen by h., '38, encompassed by dense nebulosity. '60–62, Powell noticed it much fainter and changed in form. Ellery found rapid change. The photographs of this object, now rapidly accumulating, will settle the question. It is quite possible that with the fluctuations of η, the nebula also changed. Innes, 1914, found a *comes*, 10·5 : 74° : 1″.

Canopus was thought, '61, in Chili brighter than Sirius (A. N., 1311).

ε Crucis. Lettsom, '60, found this star 6 m^{g}. instead of 4 m^{g}. as in map. Houzeau, '75, 4·5.

D.—CLUSTERS AND NEBULÆ.

The two magellantic clouds, or Nubecula Major and Minor, are of the most complex nature; large tracts of nebulosity, irresolvable, and in every stage of resolution, with clustering groups, nebulæ of all kinds, globular clusters and nebulous objects of unique character. The N. Major contains 278 clusters and nebulæ with 50 or 60 outliers, the Minor 37 with 6 adjacent. Photos with the Bruce 24-in. telescope reveal twenty stars of Type V., fifteen gaseous neb., and eight stars with bright lines in the N. Major. Also there are 808 var. stars. Es., utilizing the fact that stars of Type V mark out the Equator of our Universe, has charted the stars of Type V in the N. Major, and found that the elements obtained, using them as the Equator, show:

Semi-Major Axis	2° 35′
Position	213°
Eccentricity	0·84
Inclination	33°

whence it is obvious that the mixing up of Galactic and non-Galactic objects is due to the inclination in the line of sight. A V Type star and a 'white' neb. may be in the same field and yet through the inclination, while the V Type is on the equator the white neb., being on the opposite side of the sphere, would be situated at a distance from the equator. The N. Minor is much smaller, and only one V Type star has been found therein.

No.	R.A. 1920.	Decl.	H's Description.
	h. m.	° ′	
104.	0 20·5	72 32	47 Touc. Most glorious glob. cl.; stupendous object, completely insulated, stars all 12–14 m^g. Central blaze ruddy, rest white.
292.	48·6	73 47	Centre of N. Minor, a partially resolved cloud, 11–18 m^g. in a most barren region.
330.	53·5	72 54	Bright knot of 13–15 m^g. stars.
362.	59·6	71 16	Cl. 13–14 m^g.; central blaze.
1316.	III 19·6	37 31	Bright neb.; stellar nucleus, 2″. Another 7′ *n.*
1365.	30·6	36 24	V. bright nucleus, resolvable? between two lengthened parallel clouds of haze.
1387.	33·9	35 47	Bright cl.
1399.	35·4	35 43	Ditto, resolved?
1436	40·4	36 23	Bright cl.

D.—Clusters and Nubulæ.—*continued.*

No.	R.A. 1920.		Decl.		H's Description.
	h.	m.	°	′	
1512.	IV	1·3	43	34	Cl. just *n* of great group of large stars, 6–8 m^{g}.
1763.		56·6	66	32	Bright large neb. in Nub. Major.
1792.	V	2·5	38	6	Ditto, resolvable ?
1818.		4·1	66	32	Bright cl.
1820.		4·3	67	22	Cl. in radiating streaks.
1850.		9·1	68	52	Fine large cl., 13 m^{g}.
1855.		9·8	68	56	Bright cl. 12 m^{g}.
1851.		11·5	40	8	Superb cl. 14–16 m^{g}; central blaze.
1869.		13·9	67	28	Large cl.
1901.		18·0	68	40	Ditto.
1978.		28·5	66	18	Large oval neb.
2004.		30·8	67	20	Cl. 12–14 m^{g}.
2027.		35·0	66	58	Large cl. 9–11 m^{g}.
2070.		39·3	69	10	'Great looped neb.' round 30 Doradûs, in Nub. Maj. Visible to naked eye. Le Sueur, gaseous.
2100.		42·7	69	15	Cl. 13–16 m^{g}.
2132.		54·1	59	56	Group of bright and smaller stars.
2157.		58·2	69	12	Bright cl.
2220.	VI	18·8	44	43	Cl. coarse, brilliant; chief, 8 m^{g}.
2451.	VII	42·5	37	45	V. large bright cl.; one, 4·5, orange.
2477.		49·4	38	19	Beautiful large cl. 12 or 13 m^{g}.
2516.		57·1	60	39	Large brilliant cl. 7–13 m^{g}.; orange star in middle; vis. to naked eye.
2547.	VIII	8·3	49	2	Ditto, 7–16 m^{g}.
2792.	IX	9·4	42	6	Plan. neb. 6″ diam., bright as 9 m^{g}.
2808.		10·4	64	32	Superb cl. 13–15 m^{g}., 'like the finest dust'; central blaze.
2818.		12·8	36	17	Cl. containing neb. nearly plan.
2867.		19·2	67	58	Plan. neb., perfectly sharp and round; 8″.
2932.		32·3	46	35	V. large cl. from 8 m^{g}. 'Telescopic Præsepe.'
3114.	X	0·1	59	44	V. large, loose cl. 9–14 m^{g}.
3132.		3·7	40	2	Plan. neb., large ellip. enclosing 9 m^{g}.
3372.		41·9	59	16	Great diffused branching milky neb. with interior darkness about η Argûs.
3532.	XI	3·1	58	14	Glorious cl. 8–12 m^{g}. Most brilliant h. had ever seen.

No.	R.A. 1920.		Decl.		H's Description.
	h.	m.	°	′	
3766.		32·5	61	10	Large cl. 8–13 m^g. 150–200 stars.
3909.		45·5	47	49	Ditto, 9–14 m^g.
3918.		46·3	56	44	Plan. 12″; beautiful rich bl., bright as 7 m^g. Or., 8 m^g. 10′± *n*.
4755.	XII	48·9	59	55	Vivid and beautiful cl., 50 to 100 of various cols., some greenish, round κ Crucis, extremely red. Abbott (1862) suspected changes in number, position and colour.
5045.	XIII	11·8	63	0	Great Milky Way cl. 34 of 11 m^g., 150 or 200 smaller.
5139.		21·9	46	54	ω Centauri, cl. of full 20′; thousands of stars of two mags., 12 and 13 only, or 13 and 15; the larger like lacework, two darker spaces in centre. Baily finds 128 vars. here, nearly all with period of less than one day.
5662.	XIV	29·4	56	13	Bright cl. 9–13 m^g. 7 m^g. r, or y., central.
5882.	XV	11·4	45	21	Plan. neb., most elegant and delicate; perfectly sharp: 4″: white.
5925.		20·2	54	10	Cl. 11–14 m^g., in pairs and small groups, on a black ground.
6025.		56·9	60	16	Brilliant cl. from 7 m^g.
6067.	XVI	7·0	54	0	Superb cl. 20′; 10–15 m^g.
6087.		12·2	57	42	Coarse brilliant cl. 7–10 m^g.
6124.		20·1	40	29	Cl. 50 or 60 stars, 9–11 m^g.
6388.	XVII	30·4	44	41	Cl. 4′; 17–20 m^g., excessively close.
6405.		34·8	32	9	M 6. Cl. 7–10 m^g.
6441.		44·8	37	2	Cl. 18–20 m^g., cent. blaze. γ Telescop. in field.
6475.		48·7	34	48	M 7 ? Brilliant cl. 60, 7–12 m^g.
6637.	XVIII	26·2	32	25	M 69. Cl. 14–16 m^g.
6681.		38·0	32	22	M 70. Cl. 14–17 m^g.
6715.		49·9	30	34	M 54. Cl. 15 m^g.
6809.	XIX	34·9	31	8	M 55. Cl. 12–15 m^g.

INDEX

Double Stars (*S. Decl. printed in italics*).

R.A.	Name.	Decl.		Page.
	0 hour.			
M.		°	′	
1·2	Σ 3058	29	53	17
1·2	OΣ 547	45	22	17
1·6	Σ 3061	17	23	196
3·7	See 2	*22*	57	221
4·8	β Cass.	58	43	73
4·9	Σ 2	79	16	79
5·3	κ¹ Scul.	*28*	3	221
5·9	34 Pisc.	10	42	208
6·2	22 And.	45	38	17
9·2	OΣ 2	26	32	17
9·6	OΣΣ 1	75	36	79
10·4	β 486	*8*	13	86
10·8	35 Pisc.	8	22	208
11·6	Σ 13	76	30	79
12·4	Σ 17	28	51	17
12·4	Σ 16	54	13	73
12·6	β 392	61	5	73
13·3	38 Pisc.	8	25	208
13·3	Σ 20	16	4	209
14·2	β 393	*21*	35	86
14·3	Σ 24	25	41	17
14·5	26 And.	43	20	17
14·6	Σ 25	15	33	209
15·4	ι Ceti	*9*	16	86
18·4	42 Pisc.	13	2	209
20·2	Hu. 506	51	36	73
22·8	Σ 30	49	32	73
25·7	β 1094	59	31	74
25·9	28 And.	29	18	17
26·0	12 Cet.	*4*	24	86
	0 hour—*contd.*			
M.		°	′	
26·7	Σ 33	33	39	17
27·5	Σ 34	77	40	79
27·6	λ Cass.	54	5	74
28·3	51 Pisc.	6	31	209
28·4	52 Pisc.	19	51	209
30·4	Σ 39	*5*	0	86
30·9	Σ 40	36	23	17
31·3	13 Cet.	*4*	2	86
32·6	π And.	33	17	17
33·2	β 395	*25*	12	222
34·4	Σ 44	40	33	17
35·0	δ And.	30	25	17
35·0	h. 1041	48	56	74
35·7	55 Pisc.	21	0	209
35·9	α Cass.	56	6	74
36·1	Σ 47	23	37	17
36·6	h. 323	*4*	47	86
36·7	Σ 49	*7*	40	86
37·6	Σ 48	70	56	79
39·7	Σ 52	45	48	17
40·1	Σ 55	33	11	17
40·2	ο Cass.	47	51	74
40·7	β 492	54	46	74
42·1	Σ I. 1	30	30	18
42·9	β 494	*1*	41	86
43·3	Σ 59	50	59	74
44·0	η Cass.	57	23	74
45·4	β 1160	*14*	0	86
45·6	65 Pisc.	27	16	209
47·4	β 496	12	21	209

R.A.	Name.	Decl.		Page.
	0 HOUR—*contd.*			
M.		°	′	
47·6	Σ 65	68	25	74
47·9	Σ 67	10	10	196
48·3	β 497	60	40	74
48·7	β 734	*24*	26	222
50·2	υ^1 Cass.	58	32	74
50·2	Σ 72	38	44	18
50·3	66 Pisc.	18	45	209
50·6	Σ 74	9	0	209
50·7	36 And.	23	12	18
51·9	γ Cass.	60	17	74
52·3	μ And.	38	4	18
55·3	Σ 80	0	21	209
55·5	Σ 79	44	17	18
56·5	Σ 82	9	3	209
57·0	Es. 45	49	7	75
58·4	39 And.	40	55	18
58·6	β 396	60	39	75
59·7	26 Cet.	0	56	86
	I HOUR.			
0·7	Σ 86	*5*	54	86
1·2	Σ 87	14	58	209
1·4	ψ Pisc.	21	3	209
1·7	77 Pisc.	4	29	209
3·1	Σ 91	*2*	9	86
4·8	φ And.	46	49	18
5·4	OΣ 23	51	19	75
7·2	β 398	47	23	18
7·4	Σ 96	64	35	75
7·5	Σ 97	51	6	75
8·4	β 258	61	17	75
8·4	Σ 98	31	39	209
8·6	OΣ 26	29	39	209
9·4	φ Pisc.	24	10	209
9·5	ζ Pisc.	7	9	210
10·4	37 Cet.	*8*	21	86
12·2	Σ 106	*7*	34	87
13·8	Σ 110	*12*	45	87
15·7	42 Cet.	*0*	55	87
15·7	35 Cass.	64	15	75

R.A.	Name.	Decl.		Page.
	I HOUR—*contd.*			
M.		°	′	
15·8	Hu. 523	51	11	18
16·0	Σ 112	45	55	18
16·0	h. 2036	*16*	14	87
19·9	OΣΣ 17	38	37	23
20·1	β 1163	*7*	20	87
20·2	ψ Cass.	67	43	75
21·9	ρ Pisc.	18	46	210
22·7	Σ 122	3	8	210
22·8	ω And.	45	0	18
22·8	Ho. 7	40	41	18
23·8	β 397	*11*	20	87
24·2	OΣΣ 19	7	33	210
25·8	48 Cet.	*22*	3	87
26·0	Σ 129	12	15	210
27·2	η Pisc.	14	56	210
27·8	Σ 131	60	16	75
28·0	I. 446	*30*	42	222
28·7	Σ 130	69	29	75
30·6	100 Pisc.	12	9	210
30·9	Σ 137	30	52	238
31·7	α Urs. Mi.	88	53	248
31·8	Σ 138	7	16	210
32·1	OΣ 33	58	16	75
32·3	τ Scul.	*30*	19	222
34·3	Σ 140	40	39	18
34·9	103 Pisc.	16	13	210
35·1	I. 448	*25*	26	222
35·3	Σ 141	38	34	19
35·6	Σ 142	14	51	210
35·8	Σ 143	33	56	238
36·8	Σ 145	25	20	39
37·1	Σ 146	9	42	210
37·8	Σ 147	*11*	43	87
37·9	44 Cass.	60	9	75
39·4	Σ 150	*7*	29	87
40·0	Σ 155	9	5	210
40·2	Σ 154	43	18	19
40·3	Σ 148	63	25	75
40·7	β 6	*7*	10	87
41·9	ε Scul.	*25*	3	222
42·1	Σ 158	32	46	238

I HOUR—*contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
44·2	Σ 162	47	30	19
44·7	Σ 171	*1*	49	87
45·4	Σ 163	64	28	75
45·7	χ Cet.	*11*	5	87
45·7	1 Ari.	21	53	39
46·6	Σ 175	20	43	39
47·8	Σ 178	10	25	39
47·9	Σ 170	75	50	79
48·5	Σ 3113	44	15	19
49·1	γ Ari.	18	54	39
50·7	Σ 182	60	54	75
51·4	56 And.	36	52	19
51·7	Σ 186	1	27	210
53·5	λ Ari.	23	13	39
53·9	58 Cet.	*2*	27	87
54·5	Σ 185	75	7	79
54·8	Σ 194	24	27	39
55·1	Σ 196	20	38	39
55·2	Σ 195	44	4	19
55·3	48 Cass.	70	31	75
56·0	Σ 191	73	28	75
56·3	Σ 197	34	55	238
57·2	Σ 200	23	43	39
57·8	49 Cass.	75	44	75
57·9	α Pisc.	2	23	211
58·3	ε Tri.	32	54	238
58·4	h. 647	7	18	87
59·0	γ And.	41	51	19
59·0	Σ 199	67	18	80
59·2	10 Ari.	25	33	40
59·7	61 Cet.	*0*	43	87

II HOUR.

R.A.	Name.	Decl.		Page.
1·8	Σ 212	24	44	40
2·3	11 Ari.	25	30	40
3·9	Σ 213	50	42	202
4·8	14 Ari.	25	34	40
5·5	Σ 219	32	59	238
5·9	5 Per.	57	16	202
6·0	59 And.	38	39	19

II HOUR—*contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
6·6	Σ 224	13	18	40
7·7	ι Tri.	29	56	238
8·7	66 Cet.	*2*	46	87
8·9	Σ 228	47	6	19
10·0	Σ 232	29	16	238
11·4	Σ 237	10	24	40
11·6	Σ 235	55	32	202
12·7	Σ 239	28	23	238
12·7	Σ 240	23	30	40
13·0	Σ 244	21	52	40
13·3	Σ 233	76	1	80
13·7	Σ 245	39	54	20
13·8	Σ 246	34	7	238
13·9	OΣΣ 26	59	39	76
16·0	Σ 248	42	25	20
16·4	Σ 250	37	3	20
16·5	Σ 249	44	14	202
16·8	9 Per.	55	29	202
16·8	Σ 251	39	1	20
17·9	σ 70	41	1	20
18·3	Double	50	0	202
20·0	Σ 261	11	8	40
20·4	Σ 265	*2*	7	88
20·9	Σ 260	53	55	202
22·4	ι Cass.	67	3	76
23·7	Σ 268	55	11	202
24·1	Σ 269	29	34	238
24·2	A. 1816	36	58	238
25·3	β 518	9	13	88
25·9	Σ 271	24	53	40
27·2	Σ 272	58	5	202
27·4	Σ 274	0	45	88
27·6	Σ 273	18	2	40
28·4	Σ 276	5	59	88
30·1	Σ 280	5	59	88
30·4	ω Forn.	*28*	35	127
30·7	Σ 279	36	52	202
31·6	ν Cet.	5	15	88
32·3	30 Ari.	24	19	40
34·1	Σ 285	33	9	238
34·3	Σ 282	65	19	76

R.A.	Name.	Decl.		Page.	R.A.	Name.	Decl.		Page.
	II HOUR—*contd.*					III HOUR.			
M.		°	′		M.		°	′	
34·3	Σ 283	61	9	76	0·2	Σ 342	27	37	41
36·0	33 Ari.	26	44	40	0·7	52 Ari.	24	57	41
36·6	Σ 291	18	27	40	3·0	β Pers.	40	39	201
36·6	β 521	47	55	202	4·0	Σ 349	63	29	54
37·1	84 Cet.	*1*	2	88	4·1	κ Pers.	44	33	203
37·1	OΣ 44	42	21	202	4·4	β 528	*3*	54	88
37·3	Es. 8	53	11	202	4·7	OΣ 50	71	15	76
37·5	12 Pers.	39	54	202	4·9	Σ I. 6	7	9	88
37·8	μ Ari.	19	40	40	7·1	Σ 360	36	55	203
38·7	θ Pers.	48	53	202	7·5	OΣ 51	43	59	203
39·2	γ Cet.	2	54	88	7·7	12 Erid.	*29*	19	124
39·2	β 306	25	18	40	8·4	Σ 364	38	51	203
39·7	Σ 297	56	13	203	8·7	94 Cet.	*1*	30	88
39·7	Σ 300	29	7	238	9·6	Es. 11	56	51	203
41·9	Σ 301	53	36	203	9·8	Σ 362	59	44	54
42·1	β 9	35	13	203	9·9	Σ 367	0	27	88
42·9	Σ 305	19	2	40	10·1	β 1176	77	27	80
43·2	41 Ari.	26	56	40	10·5	OΣ 52	65	22	54
44·8	π Ari.	17	8	40	10·7	Hu. 544	50	40	203
44·8	η Pers.	55	34	203	11·9	Σ 369	40	11	203
44·9	Σ 306	60	1	76	12·1	β 84	*6*	13	124
45·4	Σ 315	*10*	53	124	14·3	95 Cet.	*1*	14	88
45·6	Σ 313	8	37	88	14·4	Σ 368	68	10	54
46·3	γ Forn.	*24*	53	127	14·8	15 Erid.	*22*	48	124
47·1	Σ 314	52	40	203	15·0	h. 3565	*18*	51	124
47·1	Σ 316	36	58	203	15·7	Σ 376	19	27	41
47·9	OΣ 48	48	15	203	16·0	τ^4 Erid.	*22*	3	124
48·4	Σ 323	6	9	88	16·8	Σ 374	67	10	54
48·6	20 Pers.	38	1	203	17·4	Σ 380	8	29	231
53·1	Σ 330	*0*	53	88	19·4	β 531	*8*	4	124
53·7	Σ 332	0	6	88	19·5	Σ 382	33	16	203
54·1	Σ 331	52	3	203	19·7	Σ 383	17	17	231
54·6	ε Ari.	21	2	41	21·9	Σ 386	54	54	54
55·1	Σ 334	6	20	88	22·5	Σ 385	59	40	54
55·4	Σ 320	79	6	80	22·9	Σ 388	50	10	204
56·6	Σ 336	32	6	203	23·4	Σ 394	20	2	231
57·5	Σ 338	10	33	41	23·4	See 25	*28*	50	127
57·9	Σ 335	63	27	76	23·7	Σ 391	44	47	204
58·6	ρ^2 Erid.	*7*	59	124	23·8	Σ 390	55	11	54
					23·8	OΣ 55	46	39	204
					23·8	66 Ari.	22	32	41

III HOUR—*contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
23·9	34 Pers.	49	15	204
24·2	β 879	11	16	231
24·5	OΣ 54	67	19	54
26·5	Σ 401	27	18	231
26·6	Σ 403	19	30	231
26·6	Σ 406	4	53	231
26·7	Σ 408	*4*	33	124
27·1	Σ 396	58	30	54
28·4	Σ 400	59	46	54
29·0	See 26	*24*	53	127
29·7	7 Taur.	24	12	231
29·8	Σ 414	19	32	231
30·4	Σ 413	33	25	204
30·6	β 533	31	25	204
32·7	Σ 422	0	20	125
32·8	OΣΣ 37	44	33	55
32·9	OΣΣ 36	63	47	55
34·6	Σ 419	69	35	80
35·1	OΣ 59	45	46	204
35·1	Σ 425	33	52	204
35·6	Σ 426	38	52	204
35·7	Σ 427	28	31	231
36·1	P. III. 97	59	43	55
36·2	Σ 430	4	52	231
37·1	Σ 436	*12*	52	125
37·3	40 Pers.	33	43	204
38·4	β 1182	48	16	204
38·7	Σ 434	38	8	204
39·3	*o* Pers.	32	2	204
39·5	Σ 439	31	55	204
39·7	β 1041	27	39	231
40·4	β 1183	45	26	204
41·5	Σ 443	41	15	204
42·5	OΣ 63	50	29	204
42·7	Alcyone	23	52	230
42·7	Σ 447	38	6	204
42·9	OΣΣ 39	56	53	55
43·4	Σ 446	52	25	204
43·9	30 Taur.	10	54	231
43·9	Σ 445	59	53	55
45·2	OΣ 64	23	37	231

III HOUR—*contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
45·5	OΣ 65	25	20	231
45·6	Σ 457	22	26	231
48·7	30 Erid.	*5*	36	125
49·0	Σ 455	69	17	55
49·1	ζ Pers.	31	39	204
50·3	32 Erid.	*3*	12	125
50·3	OΣ 67	60	53	55
52·5	ε Pers.	39	47	205
54·7	OΣ 69	38	36	205
56·2	Σ 476	38	27	205
56·2	Σ 479	22	59	231
56·6	Σ 477	41	38	205
56·6	Σ 460	80	29	80
57·1	Σ 487	*10*	40	125
57·4	OΣ 70	9	47	232
58·1	Σ 480	55	29	55
58·5	Σ 489	*7*	13	125

IV HOUR.

R.A.	Name.	Decl.		Page.
0·8	Σ 485	62	4	55
1·5	Σ 491	10	46	232
2·1	Σ 474	76	2	55
2·2	OΣ 531	37	52	205
2·5	Σ 493	5	29	232
2·7	Pair	42	59	205
3·2	Σ 495	14	57	232
3·4	OΣ 72	17	8	232
3·6	Σ 490	59	57	55
4·1	Σ 494	22	54	232
4·3	Ho. 327	31	27	205
6·1	Σ 500	40	3	205
8·0	Σ 510	0	32	125
9·0	μ Pers.	48	12	205
9·2	Σ 515	2	40	232
9·2	β 1278	8	41	232
9·2	46 Taur.	7	31	232
9·6	47 Taur.	9	4	232
9·7	Σ 503	63	58	55
9·7	Hu. 30	*23*	20	125
10·0	Σ 512	45	12	205

R.A.	Name.	Decl.		Page.	R.A.	Name.	Decl.		Page.
	IV HOUR—*contd.*					IV HOUR—*contd.*			
M.		°	′		M.		°	′	
10·6	39 Erid.	*10*	27	125	31·9	Σ 569	9	3	233
11·6	o^2 Erid.	*7*	46	125	32·0	Σ 571	*3*	45	126
11·6	OΣΣ 44	46	1	205	32·0	Σ 567	19	20	233
14·2	OΣΣ 47	50	4	205	32·5	Σ 565	41	58	206
15·0	Σ 523	23	33	232	33·5	Σ 572	26	47	42
15·3	55 Taur.	16	20	232	33·6	2 Cam.	53	19	56
15·4	φ Taur.	27	10	232	33·6	3 Cam.	52	55	56
16·3	Σ 522	51	25	55	34·3	Σ 576	*13*	11	126
16·5	Hu. 438	*16*	38	125	34·7	σ Taur.	15	45	234
17·6	OΣ 80	42	14	205	36·8	Σ 577	37	22	42
17·6	β 87	20	38	232	37·4	τ Taur.	22	49	234
17·7	χ Taur.	25	27	232	39·7	55 Erid.	*8*	56	126
18·2	Σ 526	60	5	55	40·6	Σ 589	5	9	185
18·2	β 744	*25*	26	125	41·7	Σ 587	52	59	56
18·2	Σ 536	*4*	52	125	42·1	β 186	7	7	126
18·8	Σ 535	11	12	232	45·2	96 Taur.	15	46	234
19·1	62 Taur.	24	7	232	46·8	β 883	10	56	186
19·2	Σ 533	34	8	205	46·9	OΣΣ 55	5	4	186
19·4	56 Pers.	33	47	206	47·7	Σ 609	1	2	186
19·8	66 Taur.	9	17	232	48·1	Σ 603	49	27	42
20·6	κ Taur.	22	7	232	48·5	5 Cam.	55	8	56
20·9	Σ 544	*8*	55	125	48·8	β 316	*5*	25	126
21·3	β 403	*2*	14	125	49·9	Σ 612	7	15	186
22·4	Σ 545	18	2	232	50·0	OΣ 88	61	38	56
22·8	Σ 548	30	2	232	50·9	7 Cam.	53	38	56
23·5	β 311	*24*	15	126	51·0	Σ 614	*0*	40	186
24·0	θ Taur.	15	48	233	51·1	Σ 604	69	56	56
24·5	β 184	*21*	40	126	52·5	62 Erid.	*5*	18	126
24·6	Hu. 1080	15	59	233	53·0	99 Taur.	23	50	234
25·5	80 Taur.	15	28	233	53·8	Σ 613	44	1	42
25·7	1 Cam.	53	45	55	53·8	Σ 620	13	50	186
25·9	Σ 552	39	50	206	53·8	ω Aur.	37	47	42
27·1	Σ 553	50	53	55	54·4	OΣΣ 58	14	16	186
27·8	57 Pers.	42	53	206	54·8	5 Aur.	39	17	42
28·9	Σ 559	17	51	233	54·9	Σ 623	27	13	42
30·2	Σ 557	62	49	55	55·1	Σ 619	50	9	42
31·0	46 Erid.	*6*	55	126	55·4	β 314	*16*	30	157
31·1	88 Taur.	10	0	233	56·0	Σ 618	62	58	56
31·3	α Taur.	16	21	233	56·1	Σ 621	39	5	42
31·4	Σ 570	*9*	54	126	56·3	β Cam.	60	20	56
31·5	58 Pers.	41	6	206	56·4	Σ 627	3	30	186

R.A.	Name.	Decl.		Page.
	IV HOUR—*contd.*			
M.		°	′	
56·8	Σ I. 12	26	34	234
57·0	Σ 631	*13*	37	157
57·8	Σ 630	1	30	186
58·2	11 Cam.	58	52	56
59·2	Σ 636	*8*	46	126
59·6	OΣ 95	22	54	234
59·7	9 Aur.	51	30	42
	V HOUR.			
1·7	Hu. 1097	76	22	56
2·8	66 Erid.	*4*	46	126
3·2	103 Taur.	24	9	234
3·5	14 Or.	8	23	186
4·5	Σ 649	*8*	46	126
4·7	Σ 645	27	56	42
4·9	Σ 644	37	12	42
5·5	Σ 638	69	44	56
5·9	Σ 648	31	56	42
6·4	See 47	*22*	36	157
7·6	Σ 652	0	56	186
8·6	ι Lepor.	*11*	58	157
9·1	ρ^1 Or.	2	21	186
9·3	Σ 634	79	9	56
9·4	OΣ 517	1	52	186
9·5	κ Lepor.	*13*	2	158
9·8	Σ 664	8	21	186
10·1	14 Aur.	32	36	42
10·7	α Aur.	45	56	41
10·7	β Or.	*8*	17	186
10·8	Σ 667	*7*	10	187
11·8	Σ 666	33	15	43
12·0	Σ 670	18	21	234
12·4	Σ 671	26	0	234
12·4	Σ 657	52	44	43
12·9	16 Aur.	33	17	43
13·1	Σ 669	45	10	43
13·4	Σ 678	4	36	187
13·7	τ Or.	*6*	55	187
14·5	Σ 680	20	4	234
15·6	Σ 688	*10*	49	187

R.A.	Name.	Decl.		Page.
	V HOUR—*contd.*			
M.		°	′	
16·0	Σ 686	23	58	234
16·2	Σ 677	63	19	56
16·6	Σ 692	*8*	6	187
17·0	h. 3750	*21*	19	158
17·0	Σ 687	33	43	43
17·6	Σ 693	*2*	7	187
18·5	h. 3752	*24*	51	158
18·6	23 Or.	3	25	187
18·9	Σ 697	15	59	234
19·1	Σ 694	24	54	234
19·2	σ Aur.	37	19	43
19·5	Σ 701	*8*	30	187
19·8	111 Taur.	17	18	234
19·8	Winnecke 2	*0*	53	187
19·9	Σ 698	34	47	43
20·2	Σ 699	37	58	43
20·5	η Or.	*2*	28	187
21·0	Σ 706	30	17	43
21·0	Σ 708	1	52	188
21·5	Σ 710	*11*	23	188
22·3	Σ 712	2	48	188
22·5	115 Taur.	17	53	234
22·6	ψ^2 Or.	3	1	188
24·2	h. 702	*2*	1	188
24·3	118 Taur.	25	5	234
24·8	β Lepor.	*20*	49	158
25·1	OΣΣ 64	18	21	234
25·4	Σ 721	3	5	188
25·6	31 Or.	*1*	9	188
26·2	Σ 718	49	20	43
26·4	Σ 726	10	12	188
26·5	32 Or.	5	53	188
27·0	33 Or.	3	14	188
27·3	Σ 731	*2*	9	188
27·6	Σ 730	17	0	234
27·9	δ Or.	*0*	21	188
28·6	β 1048	*1*	39	189
28·9	Σ 695	79	17	56
29·0	Σ 735	*6*	33	189
29·1	Σ 734	*1*	46	189
29·2	α Lepor.	*17*	53	158

R.A.	Name.	Decl.		Page.
	V HOUR—*contd.*			
M.		°	′	
29·5	Hu. 1107	64	6	57
30·6	Σ 743	*4*	26	189
30·7	λ Or.	9	53	189
30·8	OΣ 111	10	11	189
31·1	Σ 747	*6*	3	189
31·1	Σ 737	34	5	43
31·4	Σ 736	41	47	43
31·4	42 Or.	*4*	53	189
31·5	ι Or.	*5*	57	189
31·5	Σ 750	*4*	25	189
31·6	Σ 740	21	9	235
31·7	45 Or.	*4*	54	189
31·7	Σ 751	*1*	3	189
31·9	Σ 749	26	53	235
32·7	Webb	0	15	189
33·5	26 Aur.	30	27	43
34·0	Σ 757	*0*	13	189
34·3	Σ 755	23	15	235
34·7	σ Or.	*2*	38	190
34·9	Σ 763	10	14	190
35·7	Σ 766	15	18	235
36·2	Σ 764	29	30	43
36·7	126 Taur.	16	29	235
36·7	ζ Or.	*1*	58	190
38·1	Σ 776	25	19	235
38·5	Σ 777	22	10	235
38·9	Σ 778	30	54	44
40·7	Σ 3115	62	47	57
41·0	Σ 785	25	53	235
41·1	γ Lepor.	*22*	28	158
41·2	Σ 787	21	17	235
42·1	Σ 790	*4*	18	190
42·6	Ho. 19	35	8	44
42·8	Σ 792	*3*	17	190
43·0	Σ 780	65	44	57
43·2	133 Taur.	13	52	235
43·3	ζ Lepor.	*14*	51	158
43·6	τ Aur.	39	9	44
43·6	OΣ 118	20	51	235
43·7	52 Or.	6	26	190
44·3	Σ 798	*8*	24	190
	V HOUR—*contd.*			
M.		°	′	
44·5	Σ 791	39	33	44
44·7	Σ 796	31	46	44
46·4	Σ 806	17	52	235
46·6	Σ 809	*1*	27	190
46·7	Σ 799	38	33	44
46·9	Σ 802	40	8	44
46·7	Σ 805	28	26	44
47·7	Σ 808	29	46	44
48·3	136 Taur.	27	36	235
48·5	Σ 813	18	56	190
49·7	OΣ 123	10	14	190
50·6	Σ 816	5	51	191
50·8	α Or.	7	24	185
51·3	Σ 820	8	59	191
53·7	β Aur.	44	56	44
53·9	Σ 823	*7*	39	191
54·3	θ Aur.	37	13	44
54·8	Σ 826	*1*	20	191
54·9	OΣ 125	22	28	191
56·2	Σ 825	36	31	44
58·0	μ Or.	9	39	191
58·1	3 Mon.	*10*	36	173
58·1	35 Cam.	51	35	57
58·4	Σ 830	27	39	128
59·2	Σ 784	84	12	57
59·5	Σ 834	30	15	44
59·5	β 893	37	58	44
	VI HOUR.			
0·3	Σ 835	18	19	191
1·3	OΣ 129	29	31	44
2·0	Σ 840	10	46	191
2·5	Webb	43	9	44
2·6	Σ 831	68	0	57
4·4	OΣ 134	24	27	128
4·7	Σ 853	11	41	191
4·7	4 Mon.	*11*	8	173
4·8	Σ 855	2	31	191
4·9	3 Gem.	23	8	128
5·3	Σ 859	5	41	191

R.A.	Name.	Decl.		Page.	R.A.	Name.	Decl.		Page.
	VI HOUR—*contd.*					VI HOUR—*contd.*			
M.		°	′		M.		°	′	
5·5	41 Aur.	48	44	44	27·6	20 Gem.	17	51	129
5·6	4 Gem.	23	1	128	29·2	Σ 928	38	37	45
6·2	Σ 861	30	42	44	29·8	Σ 932	14	49	129
6·9	Σ 869	*9*	50	173	29·9	Σ 929	37	47	45
7·0	Σ 867	17	24	191	30·4	14 Mon.	7	39	174
7·9	A.C. 3	*4*	39	191	31·2	Σ 933	41	12	45
8·5	Σ 875	*13*	7	158	31·4	OΣ 149	27	21	129
10·1	Σ 877	14	37	191	31·7	Σ 939	5	23	174
10·1	η Gem.	22	32	128	32·2	Σ 935	52	22	162
10·3	Σ 872	36	11	44	32·8	Σ 936	58	11	162
10·7	β 566	*4*	33	173	32·8	Σ 942	23	43	129
10·8	Σ 866	62	14	162	32·9	ν^1 Can.	*18*	36	66
10·8	β 323	*1*	42	173	33·0	Σ 941	41	39	45
11·0	5 Mon.	*6*	15	173	33·8	γ Gem.	16	28	129
11·0	Σ 880	10	36	191	34·5	54 Aur.	28	20	45
13·2	Σ 868	73	58	57	34·7	Σ 945	41	4	45
13·6	Σ 883	39	48	45	35·3	β 571	13	3	129
14·5	Σ 884	47	9	45	36·6	Σ 949	5	47	175
14·9	Σ 888	28	28	45	36·6	15 Mon.	9	58	174
15·0	4 Lync.	59	24	162	37·8	Σ 946	59	32	162
16·5	Σ 895	5	47	191	38·4	β 19	*15*	55	67
17·5	Σ 898	11	1	173	39·0	ε Gem.	25	13	129
17·5	Σ 897	26	43	128	39·2	12 Lync.	59	32	162
17·7	Σ 3116	*11*	44	173	40·0	Σ 957	30	55	129
18·1	μ Gem.	22	33	128	41·0	56 Aur.	43	40	45
18·2	Σ 899	17	37	128	41·5	α Can.	*16*	35	65
19·1	OΣ 136	70	35	57	41·5	Σ 958	55	48	162
19·5	Σ 896	51	55	45	42·5	h. 3891	*30*	52	67
19·5	8 Mon.	4	38	173	42·7	OΣ 156	18	17	129
20·6	Σ 901	10	34	174	43·2	Σ 962	26	48	129
22·7	Σ 910	0	30	174	43·2	Σ 960	53	8	162
22·9	Σ 914	*7*	27	174	44·1	Σ 970	*11*	38	67
23·0	15 Gem.	20	51	128	44·5	Σ 964	43	51	45
23·3	Σ 906	37	26	45	44·7	Σ 971	*13*	20	67
24·0	Σ 915	5	20	174	45·3	A. C. 4	*15*	4	67
24·2	ν Gem.	20	16	128	46·5	14 Lync.	59	33	162
24·9	11 Mon.	*6*	58	174	46·5	Σ 968	52	47	162
26·1	h. 3863	*22*	32	66	46·7	β 897	*0*	26	175
26·7	Σ 921	11	19	174	46·7	Σ 976	18	47	129
27·4	Σ 926	5	50	174	46·8	36 Gem.	21	51	129
27·6	Σ 918	52	32	45	49·8	See 71	*26*	51	67

VI HOUR—*contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
50·1	38 Gem.	13	17	129
50·2	Σ 987	*5*	45	175
50·2	OΣ 161	21	40	129
50·3	Σ 981	30	16	129
50·5	Σ 986	9	36	175
50·5	15 Lync.	58	32	162
50·7	Σ 979	46	39	45
50·7	Σ 990	*14*	9	67
52·0	β 326	2	25	175
52·1	Σ 991	25	4	129
52·4	μ Can.	*13*	56	67
53·0	Σ 998	*5*	22	175
53·5	Σ 973	75	21	57
53·6	OΣΣ 80	14	21	129
54·1	Σ 994	37	13	45
54·4	Σ 1000	25	21	130
54·5	β 327	*2*	55	175
54·7	Σ 1003	*9*	3	175
54·8	Es. 339	32	33	130
55·5	ε Can.	*28*	51	67
56·6	Σ 1001	54	18	163
56·9	See 74	*21*	59	67
57·2	Σ 1011	*15*	12	67
57·4	Σ 1002	56	34	163
57·4	Σ 1010	*3*	0	175
57·5	I. 183	*25*	32	67
59·3	Σ 1009	52	53	163
59·4	ζ Gem.	20	42	130
59·5	Σ 1006	62	40	57
59·9	Σ 1012	28	15	45

VII HOUR.

R.A.	Name.	Decl.		Page.
0·8	Σ 1014	26	16	130
1·0	Σ 1015	*5*	39	175
2·6	Σ 1017	16	58	130
2·9	β 328	*11*	11	67
3·6	Σ 1023	25	7	130
3·8	45 Gem.	16	3	130
4·0	Σ 1029	*4*	33	175
4·2	Σ 1027	17	2	130

VII HOUR—*contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
4·9	Σ 1031	*13*	52	67
5·0	Σ 1030	*8*	33	175
5·5	Σ 1034	*8*	11	175
6·1	τ Gem.	30	22	130
6·3	Σ 1025	55	56	163
7·2	Σ 1035	22	25	130
7·8	Σ 1037	27	22	130
8·5	Σ 1033	52	41	163
8·5	Σ 1043	*0*	33	175
8·7	Σ 1045	*3*	1	175
10·4	Σ 1044	47	47	163
10·5	24 Mon.	*0*	1	175
10·8	Σ 1052	*10*	8	175
11·5	Σ 1056	*1*	43	175
12·8	Σ 1054	35	6	130
13·3	OΣ 170	9	26	69
13·4	Σ 1050	55	4	163
13·5	λ Gem.	16	42	130
13·8	h. 3945	*23*	10	67
14·4	Σ 1069	*13*	23	67
14·5	See 75	*25*	50	67
14·7	Σ 1067	3	1	69
15·1	Σ 1070	34	12	130
15·3	Σ 1068	13	32	130
15·3	47 Cam.	60	3	57
15·3	δ Gem.	22	8	130
15·4	30 Can.	*24*	48	67
16·1	65 Aur.	36	55	46
16·2	20 Lync.	50	18	163
16·4	19 Lync.	55	25	163
16·8	Σ 1076	4	13	69
16·9	Σ 1077	*0*	31	175
17·0	Σ 1051	73	14	57
17·7	See 76	*26*	49	67
18·4	Σ 1081	21	37	130
19·4	Σ 1082	10	52	69
19·7	See 78	*25*	37	67
20·9	Σ 1083	20	40	130
21·5	Σ 1088	14	15	131
21·7	Σ 1089	15	0	131
21·8	Σ 1090	18	41	131

R.A.	Name.	Decl.		Page.
	VII HOUR—*contd.*			
M.		°	′	
22·9	H*h*. 264	22	30	131
22·9	Σ 1086	42	56	163
22·9	β 758	48	21	163
23·0	Σ 1095	8	55	69
23·6	β 578	*17*	42	36
23·8	η Can. Mi.	7	6	69
24·0	ρ Gem.	31	57	131
24·1	Σ 1097	*11*	24	175
24·8	65 Gem.	28	5	131
25·0	Σ 1099	11	42	69
25·1	Σ 1101	*13*	39	36
25·7	Σ 1104	*14*	49	36
26·3	Σ 1103	5	25	69
26·8	Σ 1106	16	29	131
27·8	Σ 1109	*0*	21	175
27·9	Σ 1111	*8*	32	176
28·1	Σ 1108	23	4	131
29·1	OΣ 174	43	16	163
29·3	Σ 1114	9	28	69
29·5	α Gem.	32	4	131
30·1	Σ 1116	12	29	69
30·9	H*h*. 269	*23*	18	36
32·9	Σ 1121	*14*	18	36
33·6	70 Gem.	35	14	131
35·1	α Can. Mi.	5	27	68
35·5	κ Arg.	*26*	37	36
36·2	Σ 1124	22	0	132
36·4	Σ 1122	65	22	57
36·7	See 84	*19*	28	36
37·3	Σ 1130	9	54	69
37·5	Σ 1129	18	15	132
38·2	Σ 1132	*3*	19	176
39·6	κ Gem.	24	36	132
39·6	Σ 1127	64	16	57
40·4	β Gem.	28	13	132
41·8	2 Arg.	*14*	30	36
42·4	Σ 1137	4	19	69
42·9	Σ 1141	0	13	176
43·8	Σ 1140	18	32	132
44·2	5 Arg.	*12*	0	36
45·3	Σ 1149	3	25	69

R.A.	Name.	Decl.		Page.
	VII HOUR—*contd.*			
M.		°	′	
45·5	Σ 1147	24	44	132
45·9	ξ Arg.	*24*	39	36
46·2	See 87	*19*	59	37
48·1	9 Arg.	*13*	41	37
48·5	OΣ 182	3	36	70
50·5	Σ 1157	*2*	35	176
53·4	11 Arg.	*22*	40	37
54·2	14 Can. Mi.	2	27	70
55·3	Σ 1170	13	56	59
55·4	OΣΣ 90	63	19	57
55·9	Σ 1171	23	49	59
58·4	OΣ 186	26	29	59
58·6	6 Canc.	28	1	59
59·0	Σ 1174	47	32	163
59·0	See 95	*20*	6	37
59·3	β 203	*27*	20	37
	VIII HOUR.			
0·0	Σ 1178	*12*	59	37
0·3	Σ 1179	12	18	59
0·7	Σ 1177	27	45	59
1·1	Σ 1181	8	25	70
1·1	Σ 1182	6	3	70
2·4	27 Lync.	51	44	163
2·6	Σ 1183	*9*	1	176
4·2	Σ 1184	38	6	163
4·3	Σ 1169	79	45	57
4·4	Σ 1187	32	28	163
4·6	29 Mon.	*2*	45	176
4·6	Σ 1188	30	35	59
5·8	Ho. 352	*16*	1	37
6·2	Σ 1191	19	16	59
7·1	Σ 1198	1	30	145
7·6	19 Arg.	*12*	41	37
7·6	ζ Canc.	17	54	59
7·8	Σ 1197	29	47	60
10·1	Σ 1200	50	1	163
10·4	Σ 1206	7	25	60
10·6	Σ 1204	38	44	163
12·3	Σ 1193	72	37	57

VIII HOUR—*contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
13·1	Σ 1211	39	15	163
18·7	Σ 1219	7	54	60
19·3	OΣΣ 93	42	17	164
21·1	Σ 1222	37	48	164
21·9	v^1 Canc.	24	48	60
22·0	ϕ^2 Canc.	27	12	60
22·8	Σ 1228	27	49	60
23·2	Σ 1225	51	18	164
23·6	*o* Urs.	60	59	240
24·5	Σ 1233	*2*	15	176
24·9	Σ 1231	31	38	60
27·0	Σ 1234	55	38	164
27·2	Σ 1232	66	34	240
27·5	OΣ 192	75	0	57
27·9	I. 489	*19*	18	37
30·4	Σ 1242	47	24	164
31·6	Σ 1245	6	54	145
31·6	Σ 1246	10	11	60
34·4	Σ 1250	52	5	240
35·1	β 207	*19*	27	37
35·1	β 208	*22*	27	37
35·4	Σ 1248	62	19	240
35·5	Σ 1255	6	4	145
35·5	Group	45	11	164
35·8	Σ 1254	19	58	60
36·9	Σ 1260	*11*	53	145
37·4	Σ 1256	49	36	164
37·8	Σ 1258	49	10	164
38·4	Σ 1264	*8*	6	176
39·7	31 Mon.	*6*	57	176
40·0	Σ 1263	44	0	164
41·2	See 106	*23*	30	37
41·3	Σ 1270	*2*	19	145
41·5	Σ 1259	38	47	164
41·9	ι Canc.	29	3	60
42·5	ε Hyd.	6	43	145
42·8	Σ 1276	11	27	60
43·2	β 586	*16*	46	146
43·5	Σ 1281	0	17	146
44·2	ρ Hyd.	6	8	146
44·8	Σ 1279	39	53	240

VIII HOUR—*contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
44·9	Σ 1274	38	38	164
45·3	Σ 1275	57	49	240
45·5	Σ 1283	15	8	60
45·8	Σ 1282	35	22	164
47·6	15 Hyd.	*6*	52	146
47·6	Hu. 1125	32	47	60
48·5	Σ 1280	71	7	240
48·6	Σ 1288	28	43	60
49·4	σ^2 Canc.	30	53	60
49·4	Σ 1289	43	54	164
49·7	Σ 1292	*0*	17	146
49·7	OΣ 195	8	43	146
50·8	Σ 3120	43	58	164
51·6	17 Hyd.	*7*	40	146
53·1	β 210	*17*	7	146
53·6	Σ 1293	54	17	240
53·8	ι Urs.	48	22	240
54·1	α Canc.	12	10	60
54·3	Σ 1296	35	16	164
54·6	64 Canc.	32	44	61
55·9	Σ 1297	23	3	61
56·5	66 Canc.	32	34	61
56·9	Σ 1300	15	36	61
57·1	Σ 1302	3	4	146
57·2	Σ 1301	26	32	61
58·2	κ Urs.	47	28	241

IX HOUR.

R.A.	Name.	Decl.		Page.
2·5	Σ 1309	3	9	146
2·9	Σ 1311	23	19	61
3·5	σ^2 Urs.	67	28	241
4·5	Innes	*25*	32	37
4·7	Σ 1312	52	42	240
6·3	β 410	*25*	29	37
6·5	Σ 1315	62	0	240
6·6	ε Arg.	*30*	3	37
8·2	Σ 1322	16	51	61
8·3	Σ 1318	47	19	240
8·5	β 336	*16*	29	146
9·3	Σ 1321	53	3	240

IX HOUR—*contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
9·5	Σ 1304	81	44	117
10·0	Σ 1326	73	55	117
10·2	θ Hyd.	2	38	146
10·8	Σ 1327	28	15	61
11·7	Σ 1329	*0*	53	146
12·1	β 212	*8*	1	146
12·6	β 588	1	5	146
12·7	Σ 1332	23	59	151
13·1	Σ 3121	28	55	156
13·5	Σ 1333	35	42	164
13·9	38 Lync.	37	10	164
14·6	Σ 1331	61	40	240
15·2	37 Lync.	51	36	164
15·8	Σ 1343	5	21	146
16·1	Σ 1338	38	32	164
16·2	α Lync.	34	44	164
16·8	Σ 1326	78	47	117
17·1	39 Lync.	49	53	164
17·1	Σ 1341	50	27	241
18·0	Innes	*25*	37	37
18·5	Σ 1344	39	29	165
19·1	Σ 1347	3	51	146
19·4	OΣ 200	51	55	241
20·0	κ Leo.	26	32	151
20·0	21 Urs.	54	22	241
20·3	Σ 1348	6	42	146
23·3	Jacob 5	*28*	26	37
23·3	Σ 1353	16	6	151
23·4	29 Hyd.	*8*	52	147
23·5	41 Lync.	45	58	165
23·6	Σ 1355	6	36	151
24·2	ω Leo.	9	25	151
24·5	Σ 1349	67	54	241
25·1	τ^1 Hyd.	*2*	25	147
25·3	23 Urs.	63	25	241
25·8	Σ 1358	45	2	241
26·3	Σ 1360	10	58	151
26·4	See 113	*26*	14	37
27·2	β 339	*15*	23	147
27·3	Σ 1364	20	22	151
27·4	Σ 1365	1	50	147
27·6	θ Urs.	52	3	241
27·7	6 Leo.	10	5	151
27·7	Σ 1350	67	9	241
27·8	Σ 1359	56	37	241
30·4	Σ 1369	40	19	156
30·4	Σ 1374	39	19	156
30·5	Σ 1362	73	26	241
30·9	11 Leo. Mi.	36	11	156
31·3	Σ 1371	4	16	229
34·5	OΣ 204	11	8	151
39·3	Σ 1377	3	1	229
40·0	Σ 1376	43	36	241
45·4	υ Urs.	59	25	241
45·5	Σ 1381	61	0	242
46·7	φ Urs.	54	27	242
47·8	Σ 1389	27	22	151
48·5	8 Sext.	*7*	43	229
49·9	9 Sext.	5	20	229
52·7	Σ 1399	20	9	151
59·6	Σ 1402	55	54	242

X HOUR.

R.A.	Name.	Decl.		Page.
0·2	Σ 1404	*1*	19	229
2·2	Ho. 371	*30*	29	37
3·2	Σ 1407	64	51	242
3·7	31 Leo.	10	23	151
4·1	α Leo.	12	21	151
4·6	Σ 1408	73	28	242
8·0	Σ 1413	16	44	152
8·4	Σ 1416	*15*	42	147
10·8	Σ 1417	19	31	152
11·5	Σ 1415	71	38	242
12·2	ζ Leo.	23	49	152
12·8	Σ 1419	10	31	152
12·9	39 Leo.	23	30	152
13·0	Hn. 101	*20*	16	147
13·6	Σ 1421	27	56	156
15·5	γ Leo.	20	15	152
16·3	Σ 1426	6	50	152
17·2	Σ 1427	44	19	242

R.A.	Name.	Decl.		Page.
	X HOUR—*contd.*			
M.		°	′	
18·5	OΣ 216	15	45	152
20·6	Σ 1429	25	2	152
21·0	Σ 1428	53	2	242
21·4	Σ 1431	9	11	152
22·8	Σ 1434	18	29	152
23·3	31 Leo. Mi.	37	7	156
25·0	OΣ 220	10	34	152
25·7	Σ 1439	21	13	152
25·9	*h* 4321	*30*	12	37
27·0	Σ 1441	*7*	13	229
27·6	Σ 1442	22	27	152
28·7	Σ 1443	38	6	156
29·4	Σ 1447	23	4	152
30·0	Σ 1448	22	1	153
30·2	44 Hyd.	*23*	20	147
30·6	β 1074	46	4	242
30·6	Σ 1449	35	33	156
30·9	49 Leo.	9	4	153
31·7	Σ 1452	2	59	229
31·9	Pair	12	2	153
32·4	φ² Hyd.	*15*	56	147
35·0	Σ 1458	32	8	157
35·6	Σ 1459	38	50	157
35·9	Σ 1460	42	35	242
38·2	Σ 1463	47	7	242
38·5	Σ 1465	45	3	242
38·6	40 Leo. Mi.	26	45	157
39·2	35 Sext.	5	10	229
40·4	Σ 1468	21	7	153
42·2	Σ 1470	5	21	229
43·7	Σ 1473	*15*	12	147
45·2	β 596	17	34	153
45·2	Σ 1476	*3*	36	153
45·4	Σ 1477	13	21	153
46·5	Σ 1471	80	14	57
48·0	Σ 1482	7	53	153
49·9	Σ 1483	47	55	242
50·3	Σ 1486	52	33	242
51·3	54 Leo.	25	10	153
51·6	55 Leo.	1	10	153
54·2	Σ 1479	83	40	58
55·0	Σ 1495	59	20	242
55·9	Σ 1500	*3*	3	153
57·8	Σ 1502	15	3	153
58·9	α Urs.	62	11	242
59·5	A 1774	*10*	53	97
59·9	Σ 1504	4	4	153
	XI HOUR.			
0·1	51 Urs.	38	42	242
2·0	Σ 1507	7	28	153
2·5	Σ 1509	*12*	59	97
2·8	65 Leo.	2	23	153
3·4	Σ 1510	53	15	242
4·4	I. 871	*29*	32	147
4·4	Σ 1512	62	56	242
4·5	A 677	25	5	153
7·8	δ Leo.	20	58	153
8·5	β 220	*18*	4	97
9·0	Ho. 254	33	53	242
9·5	Σ 1517	20	34	153
10·0	Σ 1516	73	55	117
11·5	Σ 1520	53	12	242
12·9	β 600	*6*	42	97
14·0	ξ Urs.	32	0	243
14·2	ν Urs.	33	32	243
14·8	Σ 1527	14	43	153
15·0	Σ 1525	47	55	243
15·3	Σ 1529	*1*	12	154
15·7	Σ 1530	*6*	28	97
17·8	Σ 1533	37	32	243
19·7	ι Leo.	10	59	154
20·3	Σ 1537	20	59	154
20·4	Σ 3070	*3*	57	154
20·9	γ Crat.	*17*	15	97
22·8	83 Leo.	3	27	154
23·8	τ Leo.	3	18	154
24·6	Σ 1539	81	29	58
24·8	57 Urs.	39	47	243
25·7	Jacob 6	*24*	1	147
26·5	OΣ 234	41	43	243

XI HOUR—*contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
26·8	Σ 3072	*6*	16	154
26·8	Σ 1544	60	9	243
27·7	88 Leo.	14	49	154
27·9	OΣ 235	61	32	243
28·0	Σ 1548	*3*	5	154
28·3	H*h*. 376	*28*	49	147
30·6	90 Leo.	17	15	154
32·1	Σ 1555	28	14	243
32·3	Σ 1553	56	35	243
34·3	Σ 1560	*1*	59	250
34·4	Σ 1599	64	48	243
34·6	Σ 1561	45	33	243
35·5	Σ 1565	19	27	154
35·5	Σ 1564	27	24	154
35·8	β 1078	*14*	1	97
39·2	Σ 1568	1	13	250
43·9	93 Leo.	20	40	154
44·9	Σ 1573	67	46	117
45·0	β Leo.	15	2	154
46·6	*h* 1201	12	41	250
47·9	Σ 1575	9	17	251
48·8	Σ 1576	31	17	244
49·3	β 794	74	13	117
51·0	65 Urs.	46	56	244
51·4	Σ 1580	4	0	250
52·2	OΣ 241	35	54	244
52·7	β 918	32	39	244
55·2	β 919	33	37	244
55·9	Σ 1583	87	26	248
56·6	β 1079	*21*	20	97
57·4	Σ 1591	0	4	250
58·2	Σ 1588	72	48	117
59·4	Σ 1593	*2*	0	250

XII HOUR.

R.A.	Name.	Decl.		Page.
0·2	2 Com.	21	55	90
1·5	Σ 1600	52	23	244
1·6	Hu. 1136	63	23	244
3·3	Σ 1602	69	31	117
4·2	Σ 1603	55	55	244

XII HOUR—*contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
5·3	Σ 1604	*11*	24	250
6·4	Σ 1605	*1*	47	250
6·8	Σ 1606	40	21	62
7·5	Σ 1607	36	32	62
7·5	Σ 1608	53	53	244
7·6	OΣΣ 117	82	9	58
8·5	Σ 1613	36	13	62
10·1	Σ 1615	33	14	62
11·0	Σ 1618	10	27	250
11·1	Σ 1619	*6*	48	250
11·6	β 920	*22*	54	96
12·1	2 Can. V.	41	7	62
12·8	Σ 1625	80	34	58
13·5	OΣ 245	29	23	90
13·8	β 921	*23*	34	96
14·1	Σ 1627	*3*	30	250
14·6	Σ 1628	12	15	250
15·0	Σ 1630	56	49	244
16·0	β 605	*21*	43	96
16·3	Σ 1632	38	21	62
16·4	ζ Corv.	*21*	46	96
16·7	11 Com.	18	14	90
16·7	Σ 1633	27	31	90
17·0	Σ 1635	*11*	1	250
18·5	17 Virg.	5	45	250
18·5	12 Com.	26	18	90
19·6	See 150	*29*	53	147
20·4	Σ 1639	26	2	90
21·9	β 606	*14*	30	96
21·9	Σ 1642	45	11	62
23·2	Σ 1643	27	29	90
24·2	Σ 1645	45	14	63
24·9	17 Com.	26	22	90
25·7	δ Corv.	*16*	4	96
25·9	β 28	*12*	57	96
26·5	Σ 1647	10	10	250
27·5	Σ 1649	*10*	39	250
28·5	Σ 1652	21	33	90
28·8	Σ 1654	75	16	117
29·2	Σ 1653	32	28	63
31·2	24 Com.	18	49	90

R.A.	Name.	Decl.	Page.	R.A.	Name.	Decl.	Page.
	XII HOUR—*contd.*				XIII HOUR.		
M.		° ′		M.		° ′	
31·6	Σ 1659	*11* 36	250	2·0	Σ 1718	51 25	63
32·0	Σ 1661	11 51	251	2·3	β 930	45 41	63
34·2	Σ 1664	*11* 3	96	2·4	β 799	73 27	248
34·6	Σ 1665	*4* 53	251	2·4	h. 2638	29 27	91
36·9	Σ 1668	9 16	251	3·3	Σ 1719	1 1	252
37·1	Σ 1669	*12* 33	96	4·5	Σ 1722	15 55	91
37·7	γ Virg.	*1* 0	251	5·8	θ Virg.	*5* 7	252
37·9	31 Virg.	7 15	251	6·1	42 Com.	17 57	91
39·6	Hu. 738	*11* 34	96	6·5	15 Can. V.	38 55	63
41·2	Σ 1677	*3* 27	251	6·8	β 931	13 44	252
41·4	Σ 1678	14 49	91	8·0	OΣ 262	73 24	248
42·3	Σ 1679	50 16	63	8·3	OΣ 261	32 32	63
45·5	Σ 1681	4 15	251	9·2	54 Virg.	*18* 24	252
47·2	Σ 1682	*9* 54	251	10·7	σ 434	*10* 56	252
47·4	h. 4554	*30* 38	147	13·2	OΣ 263	50 59	63
48·0	Σ 1685	19 36	91	16·6	Σ 1734	3 21	252
48·2	32 Com.	17 30	91	19·6	Σ 1738	*14* 30	252
48·5	Σ 1694	83 51	58	19·6	β 610	*20* 31	252
49·0	Σ 1686	15 28	251	19·6	Σ 1740	3 7	252
49·4	35 Com.	21 41	91	20·2	Σ 1742	1 49	252
51·5	Σ 1689	11 56	251	20·7	ζ Urs.	55 20	244
51·6	Σ 1691	58 36	244	24·4	OΣΣ 123	65 10	117
52·1	Σ 1690	*4* 26	251	24·5	OΣ 266	16 7	91
52·3	12 Can. V.	38 45	63	28·8	Σ 1755	37 14	63
52·3	Σ 1658	75 4	117	29·0	A 567	24 25	91
52·8	Σ 1695	54 32	244	29·2	OΣ 269	35 19	63
53·0	β 925	43 59	63	29·5	Σ 1756	23 26	91
53·1	OΣ 257	46 3	63	29·6	Σ 1758	49 33	63
53·6	Σ 1696	30 48	91	30·0	Σ 1761	72 8	248
54·8	Σ 1702	38 43	63	30·1	β 114	*8* 12	252
54·9	Σ 1699	27 55	91	30·2	Σ 1757	0 6	252
55·5	44 Virg.	*3* 23	251	30·4	β 932	*12* 48	252
56·4	37 Com.	31 13	91	30·6	Σ 1760	26 41	91
56·5	46 Virg.	*2* 56	252	31·8	Σ 1767	68 8	117
57·3	78 Urs.	56 48	244	33·4	81 Virg.	*7* 28	253
58·9	Σ 1720	83 35	58	33·7	Σ 1764	2 48	253
59·5	β 341	*20* 9	252	33·9	25 Can. V.	36 42	63
59·8	Σ 1712	9 53	252	34·5	Σ 1770	51 8	245
59·8	48 Virg.	*3* 14	252	34·6	Σ 1771	70 11	248
				35·6	β 612	11 9	49
				36·2	1 Boöt.	20 22	49

XIII HOUR—*contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
37·6	Σ 1773	8	1	253
38·5	Σ 1776	46	38	64
39·1	84 Virg.	3	57	253
39·3	Σ 1775	*3*	52	253
41·7	86 Virg.	*12*	1	253
42·1	Σ 1781	5	31	253
43·5	τ Boöt.	17	51	49
43·6	OΣΣ 125	38	57	64
45·5	Σ 1785	27	23	49
47·6	OΣΣ 126	21	39	49
50·5	Σ 1789	33	13	64
50·8	Σ 1788	7	40	253
51·9	Σ 1790	*4*	14	253
55·1	Σ 1798	78	47	248
55·4	Σ 1793	26	13	49
56·0	Σ 1794	20	17	49
56·0	Σ 1795	53	29	245
57·6	τ Virg.	1	56	253
58·2	Σ 1797	19	49	49

XIV HOUR.

R.A.	Name.	Decl.		Page.
0·6	Σ 1799	*6*	11	253
4·5	Σ 1804	21	34	49
5·9	Σ 1805	4	24	253
6·5	Σ 1808	26	59	49
7·2	Σ 1807	*2*	57	253
8·0	Σ 1810	28	25	49
8·1	Σ 1814	50	38	49
9·4	Σ 1813	5	47	49
10·4	Σ 1816	29	29	49
10·4	Σ 1820	55	42	245
10·6	Σ 1817	27	4	49
10·6	κ Boöt.	52	10	50
11·3	Σ 1819	3	30	253
11·8	Σ 1827	59	37	117
12·1	α Boöt.	19	38	48
12·2	Σ 1826	47	21	50
12·6	Σ 1829	50	49	50
12·8	Σ 1825	20	30	50
13·3	Σ 1828	24	34	50

XIV HOUR—*contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
13·4	ι Boöt.	51	44	50
13·6	Σ 1831	57	5	117
14·5	β 1246	*25*	27	147
15·2	β 116	*13*	20	253
17·4	Σ 1834	48	52	50
18·4	Σ 1833	*7*	24	159
18·8	Σ 1839	54	17	50
19·4	Σ 1835	8	49	50
20·0	Σ 1849	77	4	248
20·3	Σ 1838	11	36	50
20·4	Σ 1837	*11*	18	159
21·0	β 225	*19*	37	253
21·7	Σ 1843	48	12	50
22·5	θ Boöt.	52	13	50
23·0	Σ 1842	4	3	254
23·5	52 Hyd.	*29*	8	147
24·1	φ Virg.	*1*	52	254
25·0	Σ 1850	28	39	50
26·9	β 117	*15*	15	159
28·4	β 1112	*30*	22	147
28·8	A 570	27	2	50
29·0	Σ 1855	31	59	50
30·3	Σ 1858	35	56	50
31·4	Σ 1860	55	35	117
32·9	Σ 1861	12	31	51
37·0	π Boöt.	16	46	51
37·1	β 414	*30*	35	147
37·3	Σ 1867	31	38	51
37·5	ζ Boöt.	14	5	51
38·5	Σ 1869	*5*	37	254
38·7	Σ 1872	58	19	117
38·8	Σ 1871	51	44	51
39·4	Σ 1874	49	28	51
40·4	Σ 1875	38	5	51
40·9	Σ 1873	8	3	51
41·4	54 Hyd.	*25*	6	147
41·5	ε Boöt.	27	21	51
41·6	5 Lib.	*15*	7	159
42·1	Σ 1876	*7*	3	159
42·1	Σ 1882	61	26	117
42·5	OΣ 285	42	43	51

XIV HOUR—*contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
43·0	Σ 1881	1	19	254
43·4	β 1113	2	5	254
44·1	β 346	*17*	0	159
44·8	Σ 1884	24	42	51
44·9	Σ 1883	6	17	51
44·9	μ Lib.	*13*	49	160
46·4	α^2 Lib.	*15*	42	160
47·0	39 Boöt.	49	3	51
47·1	Σ 1889	51	42	51
47·2	Σ 1886	10	3	51
47·7	ξ Boöt.	19	26	52
49·6	OΣ 288	16	2	52
52·7	H*h* 457	*21*	2	160
52·7	OΣ 289	32	37	52
53·9	59 Hyd.	*27*	20	147
54·4	Σ 1895	40	30	52
54·6	18 Lib.	*10*	51	160
54·6	Hu. 908	78	30	248
54·7	β 1085	*4*	40	160
56·2	Σ 1905	71	9	248
57·7	2 Serp.	0	14	225

XV HOUR.

0·1	Σ 1904	5	48	253
1·2	44 Boöt.	47	58	52
1·3	β 119	*6*	42	160
1·7	Σ 1907	11	57	52
1·7	Σ 1908	34	47	52
2·8	47 Boöt.	48	28	52
3·7	Σ 1910	9	32	52
4·6	Σ 3090	*0*	40	160
6·3	Σ 1918	63	25	117
6·9	Σ 1916	39	17	52
7·7	ι Lib.	*19*	30	160
8·2	Σ 1920	47	9	52
8·8	Σ 1917	15	41	52
9·2	Σ 1919	19	34	52
9·4	Σ 1921	38	58	52
9·4	Σ 1928	72	45	248
10·0	H*h*. 467	*18*	8	160

XV HOUR—*contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
10·2	Σ 1923	14	45	52
10·3	Σ 1927	62	9	118
10·9	β 350	*27*	18	160
11·9	Σ 1926	38	35	52
12·3	δ Boöt.	33	35	52
12·7	β Lib.	*9*	5	160
14·2	Σ 1931	10	43	225
14·3	β 943	1	14	225
14·6	Σ 1934	44	5	53
14·9	Σ 1932	27	7	93
15·2	5 Serp.	2	5	225
16·9	Σ 1935	30	59	93
17·0	6 Serp.	1	0	225
17·7	Σ 1936	27	19	93
19·9	η Cor.	30	34	93
21·5	μ^1 Boöt.	37	39	53
22·3	Σ 1941	26	54	93
22·5	Σ 1940	18	27	225
23·1	Σ 1939	*10*	41	160
23·7	Σ 1943	5	38	225
23·7	Σ 1944	6	22	225
24·3	Σ 1945	14	59	225
24·5	Σ 1948	55	10	118
24·6	Σ 3125	67	31	248
26·2	Σ 1949	13	20	225
26·5	Σ 1950	25	47	93
27·1	h. 4783	*19*	53	160
28·1	Σ 1952	9	56	225
28·9	ν^2 Boöt.	41	10	53
30·4	Σ 1956	42	5	135
30·9	Σ 1961	43	48	135
31·0	δ Serp.	10	48	225
33·2	OΣ 298	40	4	53
33·8	π^1 Urs. Mi.	80	43	248
34·3	Σ 1962	*8*	32	160
34·6	Σ 1963	30	22	93
34·7	β 121	*27*	23	160
35·2	Σ 1964	36	30	93
35·3	β 122	*19*	31	160
35·5	42 Lib.	*23*	34	160
36·4	ζ Cor.	36	54	93

XV HOUR—*contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
37·6	Σ 1966	*10*	53	160
37·6	Σ 1980	81	19	248
38·2	ι Serp.	19	55	225
38·3	β 35	*15*	46	160
39·4	γ Cor.	26	33	93
39·4	β 619	13	55	225
39·8	Σ 1969	60	14	118
40·0	A. 2230	2	46	225
40·3	α Serp.	6	41	226
42·5	β Serp.	15	40	226
43·3	Σ 1976	59	40	118
43·4	Σ 1973	36	41	94
43·7	Σ 3096	*5*	5	161
44·0	π^2 Urs. Mi.	80	43	248
45·7	β 946	55	38	118
45·9	Σ 3126	*2*	56	226
46·6	Σ 3097	*8*	47	161
47·2	Σ 1978	14	57	226
47·2	Σ 1979	22	43	226
48·8	2 Scorp.	*25*	5	219
49·0	Σ 1984	53	9	118
50·4	47 Lib.	*19*	9	161
51·8	Σ 1985	*1*	56	226
51·8	Σ 1986	10	20	226
53·0	Σ 1988	12	43	226
53·2	Σ 1987	3	38	226
54·3	ϵ Cor.	27	7	94
54·7	Σ 3101	*2*	51	226
54·8	Σ 1996	57	31	118
55·5	Σ 1990	22	1	226
56·2	Σ 1993	17	36	135
57·2	OΣ 303	13	31	226
58·1	OΣ 304	39	24	135
58·4	Σ 2034	83	51	249
58·8	Σ 2006	59	9	118
59·3	Σ 2000	14	13	135

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R.A.	Name.	Decl.		Page.
0·0	ξ Scorp.	*11*	10	219
0·8	β Scorp.	*19*	36	219

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R.A.	Name.	Decl.		Page.
M.		°	′	
2·3	Σ 2007	13	32	135
3·2	11 Scorp.	*12*	32	219
3·4	Σ 2008	*2*	27	226
4·5	κ^1 Herc.	17	16	135
6·1	τ Cor.	36	42	94
6·4	Σ 2015	45	34	135
7·3	ν Scorp.	*19*	15	219
7·3	12 Scorp.	*28*	12	220
8·5	Σ 2017	14	46	226
8·6	OΣ 305	33	33	94
9·5	Σ 2022	26	52	135
9·6	49 Serp.	13	45	226
10·6	Σ 2023	5	44	226
10·6	Σ 2029	28	56	94
11·3	Σ 2027	4	28	226
11·7	σ Cor.	34	1	94
14·0	Σ 2033	*2*	5	178
15·2	Σ 2037	17	37	135
15·8	Hh 504	*19*	56	220
16·3	σ Scorp.	*25*	24	220
17·3	τ Herc.	46	31	135
17·6	Σ 2041	1	25	226
18·4	γ Herc.	19	20	135
19·2	Σ 2045	61	41	118
19·3	ν Cor.	33	59	94
19·6	h. 4850	*29*	31	220
19·9	23 Herc.	32	31	135
20·8	Σ 2047	47	48	135
21·3	Σ 2044	37	13	136
21·5	ρ Oph.	*23*	19	178
21·7	ω Herc.	14	13	136
22·9	η Drac.	61	42	118
24·1	Σ 2066	76	31	249
24·5	α Scorp.	*26*	16	220
24·5	Σ 2048	*7*	58	178
24·5	Hu. 748	51	36	136
24·8	Σ 2049	26	9	136
25·4	Σ 2052	18	34	136
25·6	Σ 2051	10	47	136
26·9	λ Oph.	2	10	178
26·9	Σ 2060	56	55	118

XVI HOUR—*contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
27·7	Σ 2056	5	37	136
28·1	Σ 2057	19	28	136
28·1	Σ 2059	38	14	136
28·5	31 Herc.	33	42	136
29·4	Σ 2063	45	47	136
30·0	Σ 2065	40	9	136
30·4	32 Herc.	30	40	136
31·6	Σ 2068	47	26	136
31·9	Pair.	17	13	136
34·3	17 Drac.	53	5	118
35·1	Σ 2071	13	50	136
36·2	Σ 2079	23	9	136
36·6	42 Herc.	49	5	136
36·7	36 Herc.	4	22	136
37·9	Σ 2092	60	51	118
38·3	ζ Herc.	31	42	137
39·0	Σ 2085	21	44	137
39·1	Σ 2083	13	45	137
39·2	Σ 2087	23	49	137
39·5	Σ 2091	41	20	137
40·8	Σ 2094	23	39	137
41·9	46 Herc.	28	31	137
41·9	Σ 2097	35	52	137
42·6	Σ 2098	30	9	137
42·9	Σ 2101	35	47	137
43·1	19 Oph.	2	12	178
45·9	Σ 2103	13	24	137
45·9	Σ 2104	36	4	137
46·8	Hu. 917	77	37	249
46·9	52 Herc.	46	8	137
47·3	Σ 2106	9	33	178
47·4	21 Oph.	1	22	179
48·7	Σ 2107	28	48	137
50·8	β 241	*21*	26	179
51·4	Σ 3106	5	3	179
51·7	56 Herc.	25	52	137
52·0	24 Oph.	*23*	1	179
52·1	54 Herc.	18	33	137
52·4	S*h.* 240	*19*	25	179
54·2	Σ 3107	4	4	179
54·6	Σ 2116	63	39	118

XVI HOUR—*contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
55·2	Σ 2112	31	54	137
56·0	20 Drac.	65	9	118
57·9	Σ 2115	15	3	137
58·1	Σ 2114	8	34	179
59·0	Σ 2124	65	19	118

XVII HOUR.

R.A.	Name.	Decl.		Page.
0·0	Hu. 164	*12*	32	179
1·6	Σ 2120	28	12	138
2·0	Σ 2119	*13*	49	226
2·3	Σ 2128	59	41	118
2·7	Σ 2122	*1*	33	179
3·1	Σ 2123	6	55	179
3·7	μ Drac.	54	35	118
4·1	A 1145	*0*	59	179
5·0	OΣ 324	31	19	138
5·2	Hu. 1176	36	2	138
5·8	η Oph.	*15*	37	179
5·9	h. 589	*24*	50	179
6·6	Σ 2131	30	27	138
7·2	β 125	*26*	56	179
8·4	Σ 2138	54	36	119
8·5	Σ 2132	*3*	57	179
8·7	Σ 2135	21	19	138
9·6	Σ 2142	49	50	138
10·3	Σ 2137	16	2	138
10·5	36 Oph.	*26*	28	179
10·8	β 282	*14*	30	226
11·0	α Herc.	14	29	138
11·7	δ Herc.	24	56	138
13·1	39 Oph.	*24*	12	180
14·4	68 Herc.	33	11	138
15·1	Σ 2155	60	47	119
15·2	β 126	*17*	41	180
15·4	Σ 2152	45	40	138
15·7	Σ 2149	*6*	21	180
15·7	A 2241	*19*	15	180
15·9	Σ 2153	49	23	138
16·3	ν Serp.	*12*	46	226
19·8	Σ 2156	*0*	45	180

R.A.	Name.	Decl.		Page.	R.A.	Name.	Decl.		Page.
	XVII HOUR—*contd.*					XVII HOUR—*contd*			
M.		°	′		M.		°	′	
19·9	Hn. 134	*21*	22	180	42·5	Σ 2211	*1*	11	181
20·9	Σ 2160	15	41	180	42·5	Σ 2212	5	44	181
20·9	ρ Herc.	37	13	138	42·5	OΣ 335	21	56	139
21·1	Σ 2162	36	32	138	43·3	Σ 2225	51	59	119
21·2	Σ 2159	13	24	180	43·4	ψ^1 Drac.	72	12	119
21·5	Σ 2179	72	40	249	43·4	μ Herc.	27	47	139
21·6	Σ 2164	47	21	138	43·6	Σ 2215	17	43	139
23·7	β 129	*25*	26	180	44·3	Σ 2222	14	50	181
23·8	Σ 2165	29	32	139	45·0	OΣ 336	34	18	140
23·8	Σ 2168	35	50	139	46·1	Σ 2227	5	21	181
24·8	Σ 2166	11	27	180	47·0	Σ 2232	25	18	140
24·9	Σ 2171	*9*	56	180	48·4	OΣ 338	15	20	181
24·9	Σ 2170	10	33	180	48·6	Σ 2239	28	15	140
26·3	Σ 2173	*1*	0	180	48·8	Σ 2235	*2*	15	181
26·6	Σ 2178	35	0	139	48·8	Σ 2242	44	55	140
27·0	Σ 2180	50	56	119	50·5	Hn. 139	*11*	37	181
27·3	A 2386	2	47	180	50·5	Σ 2243	36	6	140
27·5	λ Herc.	26	10	139	50·7	90 Herc.	40	1	140
28·6	β Drac.	52	21	119	52·9	h. 5003	*30*	15	215
29·3	Σ 2182	23	55	139	52·9	Σ 2245	18	20	140
30·6	ν Drac.	55	14	119	52·9	Σ 2246	39	30	140
30·7	54 Oph.	13	13	180	53·0	Σ 2244	0	4	181
30·8	53 Oph.	9	38	180	54·6	Σ 2258	48	38	140
31·7	Σ 2187	4	12	180	54·6	γ Drac.	51	30	119
31·8	Σ 2186	1	3	180	55·0	Σ 2252	2	3	181
32·3	Σ 2188	6	40	180	55·0	Σ 2250	*6*	51	227
32·5	OΣ 340	86	57	249	55·3	Σ 2254	12	27	181
32·6	Σ 2190	21	2	139	56·0	Σ 2259	30	3	140
34·8	26 Drac.	61	56	119	56·3	Σ 2247	29	30	140
35·5	Σ 2191	*4*	56	180	56·3	Σ 2261	52	14	119
37·1	Σ 2199	55	48	119	56·6	67 Oph.	2	56	181
37·2	Σ 2207	67	10	119	57·1	β 283	*22*	47	215
37·8	Σ 2194	24	33	139	57·7	68 Oph.	1	19	181
38·4	β 1251	10	0	181	57·7	Σ 2263	26	33	140
39·8	Σ 2218	63	43	119	58·4	95 Herc.	21	36	140
39·9	Σ 2200	5	53	181	58·6	Σ 2271	52	51	119
40·1	Σ 2214	43	47	139	58·7	Ho. 76	33	20	140
40·5	Σ 2219	61	39	119	58·7	τ Oph.	*8*	11	181
40·6	61 Oph.	2	37	181	58·8	Σ 2273	64	9	119
41·8	Σ 2204	*13*	17	227	59·1	Σ 2267	40	11	140
41·8	Σ 2213	31	10	139	59·4	OΣΣ 164	7	55	182

R.A.	Name.	Decl.		Page.	R.A.	Name.	Decl.		Page.
	XVIII HOUR					XVIII HOUR—*contd.*			
M.		°	′		M.		°	′	
0·0	Σ 2268	25	22	140	26·4	Σ 2328	29	52	165
0·2	Σ 2265	6	27	182	26·9	Σ 2324	1	20	227
1·3	Σ 2284	65	57	119	27·0	Σ 2325	*10*	52	223
1·4	70 Oph.	2	33	182	27·5	Σ 2329	6	25	182
1·5	Σ 2278	56	26	119	27·5	Σ 2330	13	7	141
1·6	Σ 2277	48	28	140	28·8	β 1253	30	30	165
2·0	Σ 2276	12	0	182	30·2	Σ 2339	17	40	141
2·1	OΣΣ 165	4	33	227	30·4	Σ 2337	*14*	46	223
2·4	OΣ 341	21	26	140	30·7	See 355	*19*	20	215
2·7	Σ 2279	50	52	119	31·7	Σ 2342	4	52	182
3·9	Σ 2282	40	21	141	32·1	Σ 2348	52	17	120
3·9	β 245	*30*	45	215	32·2	OΣ 359	23	33	141
4·0	99 Herc.	30	33	141	32·3	OΣ 358	16	55	141
4·6	100 Herc.	26	5	141	32·4	Σ 2357	63	39	120
5·6	73 Oph.	3	58	182	33·4	Σ 2346	7	28	182
5·7	Σ 2283	6	8	182	33·6	Σ 2351	41	13	165
6·0	40 Drac.	80	0	119	33·7	Σ 2349	33	24	165
6·6	Σ 2289	16	27	141	33·8	Σ 2347	*0*	27	227
7·3	Σ 2291	34	0	141	34·2	α Lyræ	38	42	165
8·8	Ho. 82	33	25	141	34·2	A 88	*3*	17	28
8·9	Σ 2292	27	37	141	35·2	Σ 2356	28	38	166
9·0	μ^1 Sag.	*21*	5	215	35·5	Σ 2358	30	39	166
10·5	Σ 2294	0	9	227	35·6	Σ 2362	35	59	166
11·8	Σ 2307	69	14	120	35·9	Σ 2360	20	52	141
12·0	OΣ 346	19	45	141	36·6	Σ 2361	3	0	227
12·5	Σ 2301	23	58	141	37·0	Σ 2368	52	16	120
13·1	Σ 2326	81	28	80	38·2	Σ 2367	30	13	166
13·3	β 1274	56	34	120	39·0	Σ 2371	27	34	141
15·8	Σ 2303	*8*	1	223	39·2	Σ 2372	34	40	167
16·9	Σ 2309	25	30	141	39·8	OΣ 361	5	34	28
17·7	Σ 2306	*15*	8	223	39·9	Σ 2369	2	32	28
20·4	Σ 2313	*6*	39	223	40·6	Σ 2376	30	19	167
20·6	21 Sag.	*20*	35	215	40·6	Σ 2380	44	50	167
21·3	Ho. 432	38	42	165	41·1	46 Drac.	55	27	120
21·9	φ Drac.	71	17	120	41·4	Σ 2373	*10*	35	223
22·8	39 Drac.	58	45	120	41·5	28 Sagit.	*22*	28	215
23·0	λ Sag.	*25*	28	215	41·5	Σ 2375	5	24	227
23·1	59 Serp.	0	8	227	41·7	ε Lyr.	39	35	167
24·2	Σ 2319	19	14	141	42·0	ζ Lyr.	37	31	169
24·5	Σ 2320	24	38	141	42·2	110 Herc.	20	28	141
26·1	Σ 2322	4	0	227	42·3	5 Aquil.	*1*	3	28

XVIII HOUR—*contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
42·3	A. 1887	*10*	13	28
42·9	Σ 2394	41	57	169
42·9	Σ 2390	34	25	169
43·4	Σ 2403	60	57	120
44·2	Σ 2397	31	18	169
44·4	Σ 2391	*6*	7	223
44·7	h. 1347	28	20	169
44·9	29 Sagit.	*20*	25	215
45·0	β 971	49	19	120
45·4	Σ 2399	13	7	28
45·5	Σ 2401	21	5	142
47·0	Σ 2404	10	53	28
47·1	β Lyr.	33	16	169
48·2	Σ 2408	10	41	28
48·9	Σ 2412	13	55	28
49·4	ν² Sagit.	*22*	50	215
50·0	ο Drac.	59	17	120
50·9	δ Lyr.	36	52	169
51·1	Σ 2415	20	31	142
51·4	113 Herc.	22	33	142
51·9	OΣ 525	33	52	169
52·2	θ Serp.	4	6	227
52·3	Ho. 270	41	30	170
52·3	Σ 2419	29	7	170
52·7	β 1255	48	46	120
54·0	β 648	32	48	170
54·7	Ho. 91	17	15	142
55·3	Σ 2427	38	7	170
55·4	11 Aquil.	13	31	28
56·0	ε Aquil.	14	57	29
56·1	Σ 2425	*8*	14	29
56·1	Σ 2440	62	17	120
56·2	Σ 2430	29	29	170
56·3	Σ 2452	75	41	120
56·6	ζ Sagit.	*30*	0	215
58·3	Σ 2436	8	38	29
58·4	Σ 2437	19	3	29
58·4	h. 5082	*19*	13	215
58·6	Σ 2434	*0*	49	29
59·6	Σ 2441	31	16	170

XIX HOUR.

R.A.	Name.	Decl.		Page.
M.		°	′	
0·4	Σ 2443	14	39	29
0·7	Σ 2439	*7*	16	29
0·7	15 Aquil.	*4*	9	29
0·8	Σ 2448	35	37	170
1·0	Σ 2451	51	28	121
1·3	Σ 2445	23	12	256
1·7	ζ Aquil.	13	44	29
1·9	Σ 2446	6	25	29
2·3	S. 710	*16*	21	216
2·4	Σ 2447	*1*	29	29
2·5	Σ 2449	7	1	29
2·9	Σ 2478	69	20	121
3·0	Σ 2456	38	24	170
3·5	Σ 2455	22	2	256
3·7	Σ 2458	27	38	170
3·7	Σ 2457	22	28	256
4·1	Σ 2459	25	51	170
4·4	17 Lyr.	32	23	170
4·8	Σ 2466	29	41	170
5·1	Σ 2469	38	48	170
5·6	Σ 2467	30	42	170
5·8	Σ 2470	34	38	170
5·8	Σ 2472	37	47	171
6·1	Σ 2474	34	28	171
6·3	Ho. 572	30	26	171
7·7	Σ 2479	55	12	98
8·1	β 1204	2	29	30
8·4	Σ 2481	38	39	171
9·0	β 139	16	43	30
9·3	Σ 2483	30	13	171
10·0	Σ 2486	49	41	99
10·7	Σ 2484	18	56	213
11·0	η Lyr.	39	0	171
11·7	OΣΣ 178	14	57	30
12·7	OΣ 371	27	19	171
12·9	θ Lyr.	37	57	171
13·0	Σ 2491	28	8	171
13·2	OΣ 370	9	12	30
14·3	2 Vulp.	22	53	256
14·5	23 Aquil.	0	56	30
15·1	Σ 2499	21	48	256

XIX HOUR *contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
15·9	28 Aquil.	12	13	30
16·1	Σ 2497	5	26	30
16·2	Σ 2498	3	53	30
16·2	Σ 2505	35	21	171
16·3	26 Aquil.	*5*	34	30
16·9	OΣΣ 181	26	30	256
17·3	Σ 2507	44	13	99
17·5	Σ 2504	18	59	256
18·8	h. 2866	*18*	10	216
19·5	Σ 2510	9	21	30
19·8	β 1129	52	13	99
20·8	2 Sag.	16	46	213
21·0	Σ 2513	2	17	30
21·1	Σ 2515	21	22	256
21·7	Σ 3111	21	41	256
22·6	Σ 2522	28	36	99
23·3	Σ 2525	27	10	99
23·3	Σ 2524	25	20	99
23·3	Σ 2523	21	0	257
23·7	Schj. 22	*12*	18	30
23·8	Σ 2519	*9*	42	31
24·8	Σ 2534	36	22	99
24·9	H*h*. 619	*27*	10	216
25·4	6 Vulp.	24	30	257
26·0	Σ 2533	*0*	37	31
26·2	Σ 2532	2	44	31
26·7	Pair.	28	33	99
27·5	β Cyg.	27	47	99
28·4	Σ 2550	73	12	121
28·5	Σ 2538	36	32	100
28·9	Σ 2539	28	6	100
29·4	Σ 2537	*4*	21	31
29·8	Σ 2540	20	14	257
30·2	μ Aquil.	7	13	31
30·3	Σ 2549	63	8	121
30·7	37 Aquil.	*10*	44	31
31·0	Σ 2542	52	49	100
31·0	9 Vulp.	19	36	257
31·9	Σ I 44	59	59	121
32·3	Σ 2553	61	52	121
32·7	Σ 2554	60	6	121

XIX HOUR—*contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
33·1	Σ 2548	24	49	257
33·3	Σ 2571	78	5	121
33·7	ε Sag.	16	17	213
34·3	θ Cyg.	50	2	100
35·8	H*h*. 630	16	23	213
36·7	Ho. 111	33	47	100
38·8	OΣ 382	27	4	100
38·8	χ Aquil.	11	38	31
38·9	Σ 2562	8	11	31
39·0	Σ 2573	60	20	121
39·7	16 Cyg.	50	20	100
40·4	Σ 2567	12	11	31
40·6	β 658	26	57	257
40·8	Ho. 453	33	59	100
40·8	Σ 2565	*13*	25	216
41·0	OΣ 384	38	8	100
41·2	Σ 2570	10	35	31
41·8	h. 895	1	3	31
42·5	γ Aquil.	10	25	31
42·5	Σ 2576	33	26	100
42·5	δ Cyg.	44	56	100
42·7	Σ 2578	35	54	101
42·9	OΣΣ 191	34	49	101
43·4	χ^1 Cyg.	33	33	101
43·5	OΣΣ 192	32	42	101
44·1	Pair.	9	50	32
44·2	I. 1039	*28*	59	216
44·9	π Aquil.	10	25	32
44·9	Σ 2584	22	0	257
45·4	ζ Sag.	18	57	213
45·6	OΣ 386	36	58	101
46·6	Es. 84	38	31	101
46·9	α Aquil.	8	39	28
47·5	Σ 2587	3	53	32
48·5	ε Drac.	70	4	121
48·5	Σ 2589	0	26	32
48·5	Σ 2590	10	9	32
48·7	OΣ 389	30	57	101
49·0	OΣ 388	25	39	257
49·3	Σ 2591	6	13	32
49·5	h. 2904	*24*	8	216

XIX HOUR—*contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
49·8	Σ I. 48	20	7	257
50·3	57 Aquil.	*8*	28	32
50·4	Σ 2596	15	5	33
50·8	β 659	6	56	33
51·0	Σ 2597	*6*	57	33
51·4	β Aquil.	6	13	33
51·9	Σ 2604	63	58	121
53·0	Σ 2617	75	11	121
53·3	η Cyg.	34	52	101
53·6	ψ Cyg.	52	13	101
54·6	β 149	16	16	213
55·2	Σ 2607	42	3	101
55·3	OΣ 393	44	10	101
55·4	Σ 2606	33	3	101
55·7	Σ 2609	37	53	101
56·1	Σ 2610	35	19	101
56·4	Σ 2611	47	8	101
56·4	χ Sag.	17	17	213
56·6	See 401	*22*	52	216
57·2	OΣ 394	36	12	102
57·5	Σ 2612	6	42	33
57·6	Σ 2613	10	31	33
58·0	Ho. 584	25	58	257
58·6	16 Vulp.	24	43	257
58·7	Σ 2619	48	3	102
59·1	26 Cyg.	49	53	102
59·8	Σ 2618	15	14	33

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R.A.	Name.	Decl.		Page.
0·5	15 Sag.	16	51	214
0·5	Σ 2622	16	47	214
0·5	Σ 2624	35	48	102
0·7	Σ 2621	9	1	33
0·8	h. 1470	38	6	102
1·0	Σ 2626	30	19	102
1·6	η Sag.	19	46	214
1·8	β 57	15	16	33
3·7	Σ 2631	20	52	257
4·0	Σ 2628	9	10	33
4·5	Σ 2642	63	28	121

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R.A.	Name.	Decl.		Page.
M.		°	′	
5·9	Σ 2634	16	34	33
6·2	Σ 2639	35	15	102
6·4	θ Sag.	20	43	214
7·0	Pair.	9	57	33
7·2	H*h.* 671	*0*	22	33
7·3	Σ 2645	51	26	102
7·4	Σ 2636	*4*	50	33
8·6	β 430	35	35	102
9·1	Σ 2649	31	50	102
10·1	Σ 2646	*6*	18	33
10·2	Σ 2651	15	55	33
10·3	OΣΣ 202	6	21	33
10·6	Σ 2655	21	59	257
11·0	Σ 2654	*3*	45	33
11·0	Σ 2660	64	16	121
11·1	ο Cyg.	46	30	102
11·5	Σ 2658	52	52	103
11·6	κ Ceph.	77	28	80
11·9	β 983	25	21	257
12·0	3 Cap.	*12*	35	70
12·3	A 283	33	29	103
13·6	α Cap.	*13*	2	70
13·7	Ho. 588	31	15	103
13·9	Σ 2663	39	27	103
14·1	β 661	40	7	103
14·4	β 441	28	53	103
14·8	σ Cap.	*19*	37	71
14·9	Σ 2667	45	23	103
15·3	Σ 2666	40	28	103
15·6	Σ 2665	14	7	114
15·7	Σ 2661	*2*	30	34
15·9	Σ 2664	12	45	114
16·4	Σ 2671	55	8	103
16·5	β Cap.	*15*	17	71
17·3	Σ 2668	39	9	103
18·2	β 663	53	21	103
18·3	A. C. 17	51	12	103
18·5	Σ 2670	16	17	34
19·3	γ Cyg.	40	0	103
19·3	Σ 2694	80	17	121
20·1	β 1134	63	44	80

R.A.	Name.	Decl.		Page.	R.A.	Name.	Decl.		Page.
	XX HOUR—*contd.*					XX HOUR—*contd.*			
M.		°	′		M.		°	′	
20·2	ΟΣΣ 207	42	43	103	37·1	Σ 2713	10	17	115
20·6	Σ 2677	0	49	34	37·3	Ho. 137	29	31	104
20·8	Σ 2679	19	19	34	37·6	ΟΣ 410	40	18	104
21·1	Σ 2680	14	37	114	37·8	49 Cyg.	32	1	104
21·5	Σ 2678	*8*	33	71	38·7	α Cyg.	45	0	104
21·8	Σ 2685	63	56	80	38·8	Σ 2718	12	26	115
22·7	π Cap.	*18*	28	71	39·8	Σ 2720	16	39	115
23·3	S 749	*2*	22	34	39·9	h. 1567	*15*	17	71
23·9	Σ 2683	*13*	25	71	40·0	Σ 2722	19	27	115
24·3	ρ Capr.	*18*	5	71	40·1	51 Cyg.	50	2	104
24·4	Σ 2687	56	23	80	40·5	h. 5228	*30*	45	71
25·1	69 Aquil.	*3*	9	34	40·9	Σ 2724	23	39	257
25·3	o^2 Capr.	*18*	51	71	41·1	Σ 2723	12	2	115
26·3	Σ 2693	54	14	103	42·4	52 Cyg.	30	26	105
26·5	ι Delp.	10	38	114	42·5	Σ 2725	15	37	115
26·7	Σ 2691	37	51	103	43·0	γ Delp.	15	51	115
27·4	Σ 2690	10	59	114	43·8	Σ 2733	7	2	123
27·6	Σ 2692	26	13	257	44·3	λ Cyg.	36	12	105
27·9	44 Cyg.	36	40	103	44·3	ΟΣ 414	42	7	105
28·0	β 668	*10*	8	71	44·5	Es. 810	47	29	105
28·5	Σ 2695	25	32	257	45·5	Es. 93	52	7	105
28·8	ω^3 Cyg.	48	57	103	45·8	13 Delp.	5	43	115
29·5	β 434	41	36	104	46·1	Es. 31	32	57	105
29·6	Σ 2696	5	10	114	46·3	Σ 2732	51	36	105
30·4	Σ 2698	27	56	257	47·0	4 Aquar.	*5*	54	23
31·5	Σ 2700	32	14	104	47·1	Σ 2730	6	5	115
32·5	Σ 2699	*13*	1	71	47·1	Es. 94	49	50	105
32·5	Σ 2702	34	53	104	48·3	h. 3003	*24*	5	71
33·1	Σ 2701	11	46	114	48·6	β 155	51	7	105
33·5	Σ 2703	14	27	114	48·8	Σ 2733	7	2	123
33·8	β Delp.	14	19	114	49·1	ΟΣ 416	43	25	105
34·3	48 Cyg.	31	17	104	50·2	Σ 2734	12	48	115
34·5	Σ 2705	33	5	104	51·5	ΟΣ 418	32	24	105
34·8	τ Cap.	*15*	14	71	51·7	Σ 2735	4	13	123
35·0	θ Delp.	13	4	115	52·6	7 Aquar.	*10*	0	23
35·2	κ Delp.	9	48	115	52·9	Σ 2736	12	41	115
35·3	Σ 2707	47	39	104	53·8	β 1137	50	25	105
35·6	Σ 2708	38	21	104	54·8	Σ 2738	16	7	115
35·7	Es. 89	47	47	104	55·1	ε Equ.	3	59	123
35·9	α Delp.	15	37	115	55·9	Σ 3133	61	31	80
36·3	Σ 2711	30	13	104	55·9	Σ 2741	50	9	105

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R.A.	Name.	Decl.		Page.
M.		°	′	
56·2	Σ 2739	19	45	115
57·1	59 Cyg.	47	12	105
58·3	λ Equ.	6	52	123
58·4	60 Cyg.	45	51	105
59·0	Σ 2744	1	13	123
59·2	Σ 2747	37	20	105
59·3	Σ 2748	39	11	105
59·7	12 Aquar.	*6*	8	23
59·9	Σ 2751	56	21	80

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R.A.	Name.	Decl.		Page.
2·4	Σ 2754	12	52	115
3·3	61 Cyg.	38	21	105
3·5	Σ 2760	33	49	107
3·8	63 Cyg.	47	20	107
3·8	Σ 2764	61	51	80
3·9	Σ 2771	70	27	80
3·9	Σ 2761	24	5	257
4·0	OΣ 527	4	50	123
4·9	Σ 2766	58	41	80
5·2	Σ 2762	29	53	107
6·4	γ Equ.	9	49	123
6·8	Σ 2767	19	38	196
6·9	Σ 2769	22	8	257
7·1	Σ 2765	9	14	123
7·3	Σ 2773	43	40	107
8·5	OΣ 431	40	55	107
9·5	β 270	6	53	123
9·7	Σ 2780	59	40	80
10·4	δ Equ.	9	41	123
11·0	Σ 2779	28	45	107
11·2	OΣ 432	40	49	107
11·6	τ Cyg.	37	42	107
11·9	Σ 2783	57	58	80
12·5	Σ 2781	*7*	59	24
14·6	υ Cyg.	34	34	107
15·7	Σ 2786	9	11	123
15·8	Ho. 601	40	41	108
16·2	Ho. 286	37	51	108
16·8	Es. 98	51	59	108

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R.A.	Name.	Decl.		Page.
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17·0	Σ 2790	58	17	80
17·2	Es. 137	61	31	81
17·2	Σ 2796	78	16	81
17·5	OΣ 437	32	7	108
17·5	Σ 2789	52	38	108
17·7	Σ 2787	1	41	123
18·4	Es. 138	60	24	81
18·4	1 Peg.	19	28	196
18·9	β Equ.	6	28	123
19·7	Σ 2791	4	1	124
20·5	β 447	24	58	257
20·9	Σ 2801	80	0	81
21·2	Σ 2793	9	2	124
22·0	Σ 2807	82	10	81
22·1	Pair.	48	59	108
22·8	Σ 2797	13	20	196
25·2	OΣ 440	59	24	81
25·6	Σ 2799	10	44	196
26·9	See 449	*19*	35	71
27·2	Σ 2803	52	34	108
27·4	β Aquar.	*5*	55	24
27·6	β Ceph.	70	12	81
28·0	Hu. 964	66	42	81
28·4	Σ 2802	33	27	108
29·3	Σ 2804	20	21	196
29·9	Ho. 288	*4*	43	24
32·2	Σ 2810	58	45	81
32·5	Σ 2812	59	18	81
33·5	Σ 2809	*0*	45	24
33·6	Σ 2813	57	7	81
33·7	3 Peg.	6	16	196
35·4	24 Aquar.	*0*	25	24
35·6	OΣ 445	20	22	196
36·3	OΣ 447	41	23	109
36·5	Σ 2816	57	8	81
36·6	A. 1445	39	9	109
37·0	75 Cyg.	42	55	109
37·5	41 Cap.	*23*	37	71
37·8	Σ 2817	*0*	2	24
37·9	Σ 2819	57	13	81
40·2	ε Peg.	9	31	196

XXI HOUR—*contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
40·5	μ Cyg.	28	23	109
41·0	κ Peg.	25	17	197
41·0	Σ 2837	82	34	81
41·9	Σ 2827	63	14	81
42·8	Σ 2825	0	29	24
43·1	Σ 2826	*13*	31	71
44·8	Σ 2858	86	30	81
45·5	Σ 2828	3	1	197
45·9	Σ 2829	30	23	197
46·3	Σ 2832	50	8	109
48·6	OΣ 451	61	14	81
49·3	Σ 2840	55	25	81
49·6	Σ 2843	65	22	81
50·1	Σ 2845	62	43	82
50·4	Σ 2838	*3*	40	24
50·5	Σ 2841	19	20	197
51·7	OΣ 452	6	52	197
52·6	OΣ 456	52	9	109
53·4	OΣ 457	64	56	82
54·0	Σ 2847	3	53	24
54·0	Σ 2848	5	33	197
56·2	η Pisc. Aus.	*28*	51	212
57·2	h. 5524	*16*	0	24
57·4	Σ 2851	*12*	23	24
57·7	Σ 2852	53	47	109
58·1	29 Aquar.	*17*	11	24
58·8	Ho. 177	36	35	149
59·7	β 694	44	15	149

XXII HOUR.

R.A.	Name.	Decl.		Page.
0·5	Σ 2854	13	16	197
1·3	Σ 2873	82	29	82
1·4	ξ Ceph.	64	14	82
1·6	15 Ceph.	59	29	82
1·7	Σ 2860	60	28	82
2·2	Σ 2857	9	43	197
2·2	Σ 2861	20	25	197
2·7	19 Ceph.	61	53	82
3·0	Σ 2862	0	10	24
4·6	35 Aquar.	*18*	56	24

XXII HOUR—*contd.*

R.A.	Name.	Decl.		Page.
M.		°	′	
5·4	Σ 2870	60	44	82
5·6	Σ 2868	22	9	197
5·7	π^1 Peg.	32	47	197
5·9	Σ 2872	58	54	82
6·1	Σ 2867	7	34	197
6·5	Σ 2869	14	14	197
8·5	Σ 2876	37	16	149
8·8	Σ 2883	69	44	82
9·9	41 Aquar.	*21*	28	24
10·5	Σ 2877	16	48	197
10·5	Σ 2878	7	35	198
10·8	Σ 2882	37	21	149
10·9	Σ 2881	29	11	198
11·4	Σ 2893	72	55	82
12·0	Σ 2890	49	21	149
13·2	Σ 2891	47	35	149
13·2	Σ 2887	*1*	6	24
15·4	Σ 2894	37	22	149
15·9	Σ 2896	62	49	82
16·4	30 Peg.	5	23	198
17·0	OΣ 469	34	43	149
17·6	32 Peg.	27	56	198
19·3	Σ 2903	66	18	82
19·8	33 Peg.	20	27	198
19·9	51 Aquar.	*5*	15	25
20·2	Σ 2902	44	57	149
20·4	Σ 2901	3	25	198
22·0	53 Aquar.	*17*	10	25
22·5	34 Peg.	3	59	198
23·3	Σ 2905	14	44	198
24·3	Σ 2908	16	51	198
24·4	Σ 2910	23	7	198
24·7	ζ Aquar.	*0*	26	25
25·9	37 Peg.	4	1	198
26·2	δ Ceph.	58	0	82
26·3	Σ 2913	*8*	32	25
27·4	Σ 2917	53	5	149
27·8	Σ 2916	40	48	149
28·6	Σ 2915	7	0	198
30·5	Σ 2920	3	48	198
31·0	Σ 2923	69	57	83

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	XXII HOUR—*contd.*					XXIII HOUR.			
M.		°	′		M.		°	′	
31·2	η Aquar.	*0*	32	25	1·0	83 Aquar.	*8*	6	26
32·3	8 Lac.	39	13	149	1·2	Σ 2974	32	57	199
33·9	Σ 2926	38	29	149	3·6	Σ 2978	32	24	199
35·3	h. 5356	*28*	45	212	4·5	Hu. 994	63	11	84
35·3	Σ 2928	*13*	2	25	5·3	π Ceph.	74	57	84
35·9	Ho. 187	37	19	149	5·3	Σ 2981	*9*	16	26
36·9	Ho. 296	14	7	198	5·5	57 Peg.	8	15	199
37·0	Σ 3134	29	34	198	6·3	Σ 2985	47	32	20
38·0	Σ 2934	21	0	198	7·8	Σ 2988	*12*	22	26
38·7	Σ 2935	*8*	44	25	8·9	h. 3176	12	7	199
39·2	η Peg.	29	48	198	9·3	Σ 2990	21	39	199
40·5	13 Lac.	41	24	150	9·4	Σ 2996	81	23	84
40·5	Σ 2942	39	3	150	9·4	Σ 2991	10	38	199
42·7	ξ Peg.	11	46	199	9·9	Σ 2993	*9*	23	26
42·9	OΣ 480	57	39	84	11·7	ψ² Aquar.	*9*	31	26
43·5	τ¹ Aquar.	*14*	29	25	12·5	Σ 2995	2	2	26
43·7	Σ 2944	*4*	38	25	13·0	Σ 2997	20	58	199
45·4	τ² Aquar.	*14*	1	25	14·0	8 And.	48	35	20
45·9	Σ 2945	30	54	199	14·8	Σ 3000	24	46	199
46·2	Σ 2947	68	9	84	14·9	94 Aquar	*13*	54	26
46·2	Σ 2946	40	6	150	14·9	95 Aquar.	*10*	3	26
46·7	Σ 2948	66	8	84	15·2	96 Aquar.	*5*	24	26
47·8	OΣ 482	82	44	84	15·3	ο Ceph.	67	40	84
48·2	Σ 2950	61	16	84	16·8	OΣ 494	21	31	199
48·2	h. 1823	40	53	150	16·9	Σ 3004	43	41	20
50·4	Σ 2952	27	36	199	17·3	Σ 3006	35	0	199
50·5	β 382	44	20	150	18·0	64 Peg.	31	22	199
50·8	Σ 2954	14	46	199	18·5	97 Aquar.	*15*	29	26
51·0	β 178	*5*	25	25	18·8	Σ 3007	20	7	199
52·0	Pair.	35	55	150	19·6	Σ 3010	45	21	.20
52·2	Σ 2963	75	55	84	19·6	Σ 3008	*8*	54	26
53·0	Σ 2959	*3*	41	25	19·9	I 1058	*22*	11	26
53·4	Σ 2961	62	27	84	20·2	Σ 3009	3	16	211
55·1	Σ 2971	78	4	84	22·0	Σ 3011	76	38	84
55·2	52 Peg.	11	18	199	22·4	See 485	*22*	11	26
56·3	2 Pisc.	0	32	211	22·8	β 386	70	14	84
58·2	Σ 2970	*11*	44	26	22·8	κ Pisc.	0	49	211
58·9	2 And.	42	20	20	23·6	Σ 3013	16	11	199
					24·3	Ho. 200	85	57	84
					24·4	Σ 3017	73	40	84
					26·3	OΣ 496	58	6	76

R.A.	Name.	Decl.		Page.	R.A.	Name.	Decl.		Page.
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M.		°	′		M.		°	′	
26·6	Σ 3019	4	48	211	44·9	6 Cass.	61	46	76
26·9	OΣ 497	9	2	199	45·7	h. 5423	*25*	47	222
27·4	Σ 3021	15	46	199	45·7	Es. 700	53	38	77
28·2	Σ 3024	43	23	20	47·8	Σ 3042	37	27	20
30·0	72 Peg.	30	53	200	48·0	Ho. 205	38	50	20
31·4	See 492	*27*	56	222	48·4	β 996	75	6	84
33·6	OΣ 500	43	59	20	48·7	Σ 3043	38	14	20
35·0	h. 1896	61	45	76	48·9	Σ 3044	11	29	200
36·6	Σ 3030	*0*	50	211	49·0	Pair.	40	55	20
37·1	Σ 3031	5	49	211	50·2	h——	*27*	30	222
38·0	OΣ 503	19	51	200	52·3	Σ 3046	*9*	57	88
38·6	ω^2 Aquar.	*14*	59	26	53·9	Σ 3047	56	56	77
39·8	Σ 3033	6	48	211	54·0	Σ 3048	23	54	21
40·0	78 Peg.	28	55	200	54·6	27 Pisc.	4	0	211
40·3	h. 5417	*26*	41	222	54·9	σ Cass.	55	18	77
41·9	107 Aquar.	*19*	7	26	55·4	Σ 3050	33	17	21
42·2	Σ 3037	68	1	76	55·9	β 860	38	25	21
42·3	Σ 3038	62	13	76	57·9	85 Peg.	26	40	200
43·6	β 995	46	23	20	58·4	Σ 3053	65	39	77
43·8	Σ 3041	16	38	200	58·8	Σ 3052	70	54	84
44·8	δ Sculp.	*28*	35	222	59·0	Σ 3054	7	49	211

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218	87	519	205	742	235	952	174	1169	57
266	88	527	125	745	189	953	175	1266	60
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1980	248	3097	161	51	169	282	226	521	202
1999	219	3101	226	55	31	283	215	528	88
2034	249	3106	179	57	33	288	115	531	124
2054	118	3107	179	67	105	306	40	533	204
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2392	168	3118	175	114	252	327	175	588	146
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2595	257	517	186	184	126	410	37	694	149
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5·2	1	63 30	77
15·7	4	44 16	21
16·5	5	2 35	211
23·3	10	35 8	21
53·0	14	67 16	77
I HOUR.			
11·7	19	25 14	211
50·1	32	69 49	77
53·4	35	30 45	239
57·8	39	54 51	206
II HOUR.			
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39·2	55	32 2	239
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5·2	64	57 36	206
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24·1	72	55 6	206
37·7	76	14 32	235
40·0	77	53 40	207
58·9	81	61 35	58
IV HOUR.			
7·9	82	32 20	207
8·8	82*a*	49 17	207
9·8	83	14 21	236
16·3	84	27 10	236
17·7	86	20 38	236
19·0	87	22 46	236
40·1	96	32 47	207
42·9	97	68 2	58
44·0	98	34 52	46
IV HOUR—*contd.*			
M.		° ′	
46·0	100	15 39	236
46·5	101	28 24	236
47·1	102	38 22	46
49·0	104	22 39	236
54·9	107	39 32	46
57·5	111	6 32	191
59·7	113	23 33	236
V HOUR.			
5·9	117	*5* 37	126
7·6	120	*11* 57	159
10·5	122	*0* 39	191
12·9	123	42 43	46
13·8	125	35 43	46
14·2	126	*8* 18	192
16·6	130	32 26	46
19·4	131	*9* 24	192
22·0	137	29 51	46
29·9	143	25 51	236
33·6	148	24 57	236
34·4	149	23 17	236
40·3	152	24 23	236
42·4	157	*5* 54	192
42·7	156	44 49	46
43·0	158	30 36	46
49·3	161	7 9	192
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3·6	170	*21* 48	159
5·9	172	26 2	132
7·0	173	21 54	132
7·5	174	22 56	132
8·5	175	27 11	132
12·0	177	33 15	46
15·5	181	14 41	192
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31·0	192	38	31	46
31·3	194	*1*	26	177
31·8	195	*5*	19	177
40·5	200	3	24	177
43·4	201	0	47	177
49·2	206	*4*	28	177
54·1	208	6	16	177
55·0	210	*17*	1	68
57·0	211	*3*	8	177
	VII HOUR.			
3·1	216	*7*	26	177
4·3	218	*11*	46	68
10·3	219	*9*	7	177
15·7	225	25	9	133
19·7	229	*25*	37	68
21·2	230	*2*	59	177
22·4	231	46	8	165
22·5	232	*20*	48	37
27·1	235	24	41	133
27·8	236	0	38	177
30·3	238	*14*	22	37
32·3	240	2	15	70
38·8	247	39	2	165
46·2	253	*13*	53	38
	VIII HOUR.			
10·0	261	24	58	61
15·9	264*a*	3	1	147
21·6	268	*23*	47	38
40·2	274	78	28	58
48·8	279	19	37	61
	IX HOUR.			
15·8	292	57	2	245
16·5	293	0	31	148
	X HOUR.			
M.		°	′	
39·5	318	67	50	245
	XI HOUR.			
47·2	336	*10*	46	97
54·1	337	3	56	254
	XII HOUR			
26·3	352	4	51	254
	XIII HOUR.			
19·7	378	47	25	64
57·0	389	38	16	64
	XIV HOUR.			
10·6	399	69	49	249
20·6	401	21	50	53
20·6	402	26	5	53
35·9	411	32	53	53
37·9	414	31	54	53
42·4	416	15	26	53
53·4	419	*12*	7	161
56·3	420	66	15	122
	XV HOUR.			
18·0	430	*28*	18	220
39·4	437	*1*	27	228
50·1	443	*20*	35	161
51·7	444	*20*	33	161
55·5	446	36	15	95
	XVI HOUR.			
23·4	459	*7*	25	182
34·7	465	*12*	10	182
46·9	472	*0*	20	183
	XVII HOUR.			
7·8	482*a*	40	44	142
14·6	485	31	31	142
15·7	486	2	13	183
22·3	490	16	59	183

Es.-Birm. Stars—*contd.*

R.A.	No.	Decl.		Page.
	XVII HOUR—*contd.*			
M.		°	′	
24·5	494	71	56	122
25·0	492	*19*	25	183
30·1	495	14	54	183
30·5	497	12	35	183
40·0	502	4	22	183
40·2	501	*18*	37	183
43·5	503	*3*	37	183
	XVIII HOUR.			
3·5	512	6	32	184
4·4	514	43	27	142
5·1	513	*15*	18	216
5·5	516*a*	42	13	142
8·3	518	*18*	58	216
8·9	519	*19*	16	216
9·1	520	*19*	7	216
9·3	521	33	16	142
9·5	522	22	48	142
10·7	523	*18*	57	216
10·9	524	*19*	59	216
13·7	526	*18*	17	216
13·8	527	*13*	28	223
16·6	530	*24*	57	216
23·4	535	*21*	17	216
26·7	537	*21*	18	216
26·8	539	*17*	28	216
28·1	542	*14*	55	223
32·9	550	37	36	172
34·3	551	*13*	52	223
38·2	557	*19*	22	217
39·5	559	36	28	172
40·1	561	36	53	172
40·4	562	*6*	43	223
40·6	564	39	13	172
42·0	566	33	6	172
45·4	569	*6*	0	224
53·5	576	0	21	34
54·9	578	14	15	34
56·2	579	40	34	172

R.A.	No.	Decl.		Page.
	XIX HOUR.			
M.		°	′	
1·4	586	23	12	258
5·3	589	24	3	258
14·6	595	*16*	4	217
16·0	596	27	6	172
16·1	597	22	25	258
21·0	599	36	2	172
22·4	600	50	4	109
24·4	607	76	25	122
29·4	611	*16*	33	217
44·8	624	22	34	258
59·3	639*a*	20	50	214
	XX HOUR.			
1·6	643	20	26	214
2·0	642	*27*	27	217
13·8	659*a*	49	41	110
18·4	664	36	40	111
18·7	665	37	17	111
25·5	672	15	56	116
31·2	677	28	2	258
34·3	679	17	59	116
44·1	688	45	45	111
45·2	689	*0*	51	26
45·3	690	22	42	258
	XXI HOUR.			
10·8	703	59	47	85
23·8	706	62	14	85
38·6	711	35	8	112
56·1	721	23	33	200
	XXII HOUR.			
0·4	722	27	58	200
8·6	723*a*	52	17	21
9·7	725	56	52	85
13·5	726	4	44	200
22·0	729	57	26	85
	XXIII HOUR.			
20·3	746	58	44	77
54·9	762	62	26	78
57·2	764	59	55	78

OTHER STARS WITH INTERESTING SPECTRA.

(H=Hyd. lines bright. M=Type III. N=Type IV. O=Type V.)

R.A.	Mag. and class.	Decl.	Page.
0 HOUR.			
M.		° ′	
10·4	5·8 M	*8* 14	89
10·6	5 M	*19* 22	89
23·9	5·4 M	17 27	211
38·7	10 O	64 21	77
42·4	5 M	15 2	211
51·9	2 H	60 17	74
I HOUR.			
38·6	4·2 H	50 17	206
40·0	9·4 N	53 34	206
56·2	4·1 M	*21* 28	89
56·5	5·8 M	*9* 52	89
II HOUR.			
30·9	5·6 M	34 20	239
35·3	9·1 O	56 23	206
46·2	9·5 O	56 36	206
51·3	6 M	18 1	41
III HOUR.			
0·0	3·4 M	38 32	206
12·9	4·5 H	65 12	58
30·8	4·3 H	47 55	207
42·4	3·2 H	23 52	237
42·7	4·7 M	*12* 21	126
54·3	2·8 M	*13* 44	126
IV HOUR.			
2·8	4·5 H	47 30	207
24·4	5·5 H	*13* 13	126
30·4	5·4 M	*8* 23	126
31·3	1 K ?	16 21	233
36·9	4·6 M	*19* 49	126
44·6	6 H	*5* 48	126
48·2	5 M	14 7	191
59·2	5·3 H	58 52	58
V HOUR.			
20·6	4·7 H	1 46	192
27·5	4·4 M	18 32	236
V HOUR—*contd.*			
M.		° ′	
28·7	5·5 H	18 29	236
32·5	7·9 N	*25* 17	159
50·8	1 M	7 24	185
53·8	4·8 M	45 56	46
VI HOUR.			
0·3	6·0 H	*6* 41	192
4·2	5·8 M	*19* 9	159
10·5	5·5 M	61 33	165
17·7	5·5 H	*11* 45	67
24·9	5 H	*6* 58	174
37·0	8·1 N	31 32	132
41·4	5·2 H	*30* 59	68
50·9	6·5 O	*23* 50	68
VII HOUR.			
4·2	5·7 H	*23* 43	68
8·8	5·4 M	16 20	133
11·0	4·7 H	*26* 13	68
11·6	3·8 H	*26* 38	68
15·3	4·9 O	*24* 25	68
21·0	5·2 H	*16* 2	68
23·6	5·5 H	*22* 55	68
44·8	5·3 H	*25* 42	38
VIII HOUR.			
55·4	5·1 M	67 58	245
IX HOUR.			
23·6	2 K	*8* 19	148
37·6	4·7 H	*23* 13	148
45·3	7 M	40 0	157
X HOUR.			
17·6	3·1 M	41 54	245
51·9	6·5 M	6 36	155
XI HOUR.			
34·3	6·1 M	8 35	254
41·7	4·3 M	6 59	254

OTHER STARS WITH INTERESTING SPECTRA—*contd.*

(H=Hyd. lines bright. M=Type III. N=Type IV. O=Type V.)

R.A.	Mag. and class.	Decl.		Page.
		XII HOUR.		
M.		°	′	
23·8	5·9 M	56	9	246
30·1	3·8 H	70	14	121
43·8	6·7 M	4	0	254
50·2	5·2 M	*9*	6	254
51·6	3 M	3	50	254
55·0	4·8 M	17	50	92
		XIII HOUR.		
13·6	5·2 M	5	53	255
27·8	5·1 M	*5*	50	255
37·7	5·5 M	55	5	246
		XV HOUR.		
10·8	8 M	*2*	6	161
32·8	6·7 M	15	21	228
		XVI HOUR.		
4·6	6·4 M	8	45	228
22·4	5·2 H	*18*	17	182
24·5	1 M	*26*	16	220
		XVII HOUR.		
11·0	3 M	14	29	138
39·7	8·8 H	*6*	15	183
59·0	6·1 H	*24*	22	216
		XVIII HOUR.		
3·3	9·6 O	*19*	25	216
3·7	7·8 O	*21*	16	216
14·6	8·8 O	*11*	40	223
24·5	6·2 H	*25*	18	216
40·2	8·2 H	*7*	11	223
		XIX HOUR.		
17·1	4·7 H	*16*	7	217
29·8	6·9 M	5	17	34
43·8	4 M	18	20	214
56·4	6 M	17	17	213
57·3	8·7 N	9	17	34

R.A.	Mag. and class.	Decl.		Page.
		XX HOUR.		
M.		°	′	
2·9	7 O	35	26	109
7·2	7·8 O	35	56	109
8·8	7·9 O	35	57	110
9·3	7·4 O	38	7	110
11·5	7·9 O	36	25	110
14·0	8 O	37	11	110
14·8	6 H	37	47	110
16·6	8 O	38	29	111
17·7	6·8 O	43	36	111
18·1	9·5 N	35	21	111
18·5	9·5 O	36	40	111
43·5	4·2 M	*5*	19	26
57·1	4·7 H	47	12	105
		XXI HOUR.		
13·8	4·4 H	34	28	111
17·7	5·2 H	64	32	85
26·3	4·5 M	23	17	200
32·6	4·7 H	*19*	50	72
38·2	5·8 M	5	19	200
41·1	4 M	58	25	85
47·2	7·7 H	12	15	200
		XXII HOUR.		
1·5	5·9 M	62	44	85
17·6	4·9 H	11	48	200
21·2	5 H	0	57	27
32·3	5·7 H	39	13	149
59·8	4·6 H	3	23	211
		XXIII HOUR.		
3·0	5·2 M	8	53	201
11·7	9 O	60	1	77
14·0	4·9 M	48	34	21
29·5	6 M	22	6	201
39·3	5 M	9	53	201
42·3	6·2 N	3	2	211
57·8	5 M	*6*	28	212

NEBULÆ AND CLUSTERS.

R.A.	N.G.C.	Decl.		Page.
		0 HOUR.		
M.		°	′	
36·0	205	41	14	21
38·4	224	40	50	21
38·8	225	61	21	78
43·6	253	*25*	44	222
48·8	288	*27*	1	222
		I HOUR.		
5·0	404	35	17	23
14·1	457	57	54	78
20·6	524	9	7	212
27·3	584	*7*	17	89
27·9	581	60	17	79
29·3	598	30	15	239
31·2	613	*29*	49	222
37·2	650	51	10	207
40·5	663	60	51	79
53·0	752	37	17	23
		II HOUR.		
15·1	869	56	47	207
23·6	936	*1*	32	89
27·8	957	57	10	208
35·4	1023	38	43	23
36·9	1039	42	26	208
37·6	1055	0	6	89
38·6	1068	*0*	21	90
42·1	1084	*7*	55	127
42·9	1097	*30*	36	127
		III HOUR.		
9·2	1245	46	56	208
22·7	1332	*21*	37	127
36·6	1407	*18*	50	127
41·4	1435	23	32	237
59·5	Ap. I. 356	69	36	58

R.A.	N.G.C.	Decl.		Page.
		IV HOUR.		
M.		°		
0·1	1501	60	41	58
9·1	1528	51	2	208
10·5	1535	*12*	54	127
41·4	1647	18	55	237
59·6	1758	23	40	237
		V HOUR.		
14·6	1857	39	16	47
20·9	1904	*24*	36	159
22·7	1907	35	15	47
23·3	1912	35	46	47
26·1	1931	34	11	47
29·7	1952	21	58	237
31·0	1960	34	5	47
31·0	1976	*5*	26	192
31·6	1981	*4*	24	195
37·7	2022	9	2	195
37·8	2024	*1*	54	195
42·6	2068	0	2	195
47·1	2099	32	32	47
		VI HOUR.		
3·9	2168	24	21	133
4·3	2169	13	58	195
24·0	2232	*4*	43	177
28·4	2244	4	55	177
43·6	2287	*20*	40	68
47·7	2301	0	33	177
59·1	2323	*8*	14	177
		VII HOUR.		
14·1	2360	*15*	29	68
24·4	2392	21	5	134
28·2	2409	*17*	1	38
32·9	2422	*14*	18	38
33·7	2420	21	45	134
38·1	2437	*14*	38	38

NEBULÆ AND CLUSTERS—*contd.*

R.A.	N.G.C.	Decl.		Page.
		VII HOUR—*contd.*		
M.		°	′	
38·3	2440	*18*	1	38
41·2	2447	*23*	41	38
51·1	2482	*24*	5	38
56·1	2506	*10*	22	38
		VIII HOUR.		
7·0	2539	*12*	34	38
9·8	2548	*5*	33	178
35·5	2632	20	16	62
44·3	2655	78	31	59
46·9	2682	12	6	62
47·6	2683	33	43	157
		IX HOUR.		
16·5	2841	51	19	246
27·6	2903	21	51	155
43·2	2985	72	39	246
49·0	3031	69	26	246
		X HOUR.		
1·2	3115	*7*	20	229
9·6	3166	3	49	229
10·1	3147	73	50	122
20·9	3242	*18*	14	148
22·8	3245	28	55	157
43·6	3379	13	0	155
		XI HOUR.		
1·7	3521	0	24	155
6·8	3556	56	6	246
10·0	3587	55	27	246
10·4	3593	13	15	155
11·2	3599	18	33	156
13·8	3610	59	17	247
14·0	3613	58	26	247
16·1	3623	13	26	156
18·7	3655	17	2	156

R.A.	N.G.C.	Decl.		Page.
		XI HOUR—*contd.*		
M.		°	′	
21·8	3675	44	2	247
37·7	3817	10	45	156
48·8	3941	37	26	247
55·3	4026	51	24	247
		XII HOUR.		
3·0	4111	43	34	64
6·0	4147	18	59	92
9·7	4192	15	21	255
12·8	4216	13	36	255
14·1	4251	28	37	92
14·8	4254	14	52	255
15·0	4258	47	45	247
15·8	4274	30	4	92
16·1	4278	29	43	92
17·8	4303	4	55	255
20·4	4361	*18*	20	97
21·4	4382	18	38	92
22·1	4406	13	23	255
22·5	4414	31	40	64
24·3	4449	44	32	64
25·7	4472	8	27	255
26·8	4490	42	5	64
27·4	4494	26	13	92
28·0	4501	14	52	255
30·0	4526	8	8	255
32·0	4559	28	24	92
32·4	4565	26	26	92
35·3	4590	*26*	19	148
35·8	4594	*11*	11	255
38·2	4631	32	59	64
39·6	4649	11	59	255
44·5	4697	*5*	22	256
44·9	4699	*8*	14	256
46·5	4725	25	56	92
47·1	4736	41	33	64
48·3	4754	11	45	255
52·8	4826	22	7	92

NEBULÆ AND CLUSTERS—*contd.*

R.A.	N.G.C.	Decl.		Page.
	XIII HOUR.			
M.		°	′	
7·2	5005	37	27	64
9·0	5024	18	35	92
12·2	5055	42	27	64
13·7	5061	*26*	19	148
26·5	5194	47	36	65
38·5	5272	28	47	65
46·6	5322	60	35	247
	XIV HOUR.			
2·3	5466	28	54	53
25·4	5634	*5*	37	256
56·3	5820	54	12	54
	XV HOUR.			
2·4	5846	1	55	256
4·3	5866	56	5	122
12·8	5897	*20*	43	161
14·4	5904	*2*	22	161
	XVI HOUR.			
12·3	6093	*22*	47	221
18·7	6121	*26*	20	221
28·0	6171	*12*	53	184
38·8	6205	36	36	143
41·6	6210	23	57	144
43·1	6218	*1*	48	184
44·7	6229	47	40	144
52·9	6254	*3*	59	184
56·1	6266	*30*	3	221
57·7	6273	*26*	9	184
	XVII HOUR.			
14·5	6333	*18*	26	184
14·7	6341	43	14	144
33·4	6402	*3*	12	184
52·2	6494	*19*	1	184
57·5	6514	*23*	2	217
58·6	6543	66	38	122
58·8	6523	*24*	23	217
59·9	6531	*22*	30	218
	XVIII HOUR.			
M.		°	′	
7·9	6568	*21*	37	218
8·7	6572	6	50	184
13·8	6603	*18*	27	224
14·5	6611	*13*	49	224
15·2	6613	*17*	10	224
16·3	6618	*16*	13	224
19·6	6626	*24*	55	218
24·6	6633	6	29	228
27·2	M. 25	*19*	11	218
31·5	6656	*24*	3	218
40·8	6694	*9*	29	224
46·6	6705	*6*	22	35
47·7	6709	10	15	35
48·7	6712	*8*	48	224
51·1	6720	32	56	172
53·3	6724	10	15	35
	XIX HOUR.			
13·5	6779	30	2	173
14·6	6781	6	23	35
40·5	6818	*14*	21	219
42·7	6826	50	19	112
50·2	6838	18	34	214
56·1	6853	22	30	259
	XX HOUR.			
1·1	6866	43	46	112
1·4	6864	*22*	9	219
18·8	6905	19	51	116
20·2	6910	40	31	112
29·8	6939	60	22	85
30·3	6934	7	8	116
31·2	6940	28	2	112
42·4	6960	30	26	112
53·1	6992	31	23	113
59·8	7009	*11*	41	27

NEBULÆ AND CLUSTERS—*contd.*

R.A.	N.G.C.	Decl.		Page.
		XXI HOUR.		
M.		°	′	
4·0	7027	41	55	113
26·1	7078	11	49	201
29·3	7089	*1*	12	27
29·4	7092	48	5	113
35·8	7099	*23*	32	72
		XXII HOUR.		
M.		°	′	
12·0	7243	49	29	150
		XXIII HOUR.		
20·7	7654	61	9	85
22·0	7662	42	6	23
53·0	7789	56	16	79

THE END.

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